

Local Transportation Assessment –Final Report

Hayward Retail Center

Hayward, California

Prepared For:

LSA

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Project No. 25541, City of Hayward Planning Application #202002474

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EXECUTIVE SUMMARY

This report presents the findings and conclusions of the local transportation analysis conducted by Kittelson & Associates for the proposed Hayward Retail Center project (project) located in Hayward, California. This report documents the non-California Environmental Quality Act (CEQA) local transportation analysis conducted for this project and complements the CEQA transportation impact analysis documented in the *CEQA Transportation Analysis Report*.

The project is located at the former Kmart site at 26231 Mission Boulevard at the southwest corner of Mission Boulevard / Harder Road (assessor's parcel number 452-0020-009-01). The project would consist of:

- An approximately 3,267 square-foot drive-through restaurant,
- An approximately 3,879 square-foot drive-through restaurant, and
- An approximately 88,000 square-foot commercial building, subdivided into nine tenants ranging from approximately 1,800 square feet to approximately 32,000 square feet.

SUMMARY OF FINDINGS

The *CEQA Transportation Analysis Report* determined that the project would not be expected to contribute additional vehicle miles traveled (VMT) under the City of Hayward's (City's) Senate Bill 743-consistent VMT criteria. Therefore, it was determined that the project would result in a **less-than-significant** transportation impact under CEQA. No mitigation measures were identified.

It is recommended that the following non-CEQA recommendations identified in this Local Transportation Assessment ("LTA"), be incorporated as part of this project:

- Install a traffic signal at Harder Road & Dollar Street. With signalization, the intersection would operate within City level-of-service (LOS) standards. A signal would bring operations at the intersection to within City LOS standards in Existing Plus Project and Cumulative Plus Project weekday AM and PM peak hour conditions. Since the project results in operational deficiencies under the Existing Plus Project scenario and this intersection serves as a primary project access driveway, the project's fair share contribution to improvements is 100%.

Signalization of this intersection would provide an additional controlled pedestrian crossing of Harder Road (current crossing opportunities at Mission Boulevard and at Jane Street are approximately 1,100 feet apart) and would improve pedestrian access to and from the project site. A signal would also provide dedicated phases for controlled access into and out of the project site, including northbound drivers and westbound left-turning drivers who would otherwise need to identify gaps in traffic.

Separate simulation analysis, documented in the memorandum included in Appendix 8, demonstrated that the signal is feasible from an operations standpoint. That memorandum included the following recommendations for the traffic signal:

- o Provide a dedicated left-turn lane and a shared right/through lane on the northbound approach at Harder/Dollar. The project proposed site plan can accommodate a 11-foot-wide left-turn lane, an 11-foot-wide through/right turn lane, and a 13-foot, 9-inch-wide southbound receiving lane while retaining sidewalks on both sides of the roadway.
- o Connect the Harder/Dollar signal controller to the existing SCATS coordinated system at Mission/Harder. Per City staff advisement, coordination would also require connecting the controller at Harder Road & Jane Avenue to the system. This connection along Harder Road from Mission Boulevard to Jane Avenue would create a larger coordinated system that would adjust signal cycles dynamically to maintain smooth traffic flow through the new traffic signal at Harder Road/Dollar Street while allowing phasing to be responsive to future traffic demands.
- o Install KEEP CLEAR pavement markings within the Harder/Dollar intersection.
- o Install high-visibility continental or ladder-style crosswalks and provide pedestrian signal phases across the three newly-marked crosswalks (across the east, west, and south legs). The signal should include pushbutton actuation for pedestrians and an accessible pedestrian signal (APS).
- o Include at least a four-second leading pedestrian interval (LPI) in the signal timing for all four pedestrian phases, which would give pedestrians a head start crossing the intersection and improve their visibility to right-turning motorists.
- o Stripe two-stage turn queue boxes for both eastbound and westbound left turns for people biking. Pages 25-26 of Appendix D of the Hayward Bicycle and Pedestrian Master Plan (BPMP) include details and guidance for designing and installing the treatment.
- o Install an advanced stop bar (“bike box”) on the eastbound approach to Harder/Dollar for people biking to position themselves in front of drivers turning right at Dollar Street or at Mission Boulevard. Details and design guidance are provided on pages 23-24 of Appendix D to the BPMP.
- o Provide green “crossbike” markings to continue the bicycle lane through the intersection and clearly delineate space for people biking through the intersection along Harder Road eastbound and westbound. Pages 27-28 of Appendix D to the BPMP include details and design guidance.
- o When designing the horizontal geometry for the intersection, consider pulling back the left-turn stop bar to allow for truck over tracking.

Additional recommendation related to site access include:

- Coordinate with the City to provide treatments at the project driveways to reduce the presence of vehicle-pedestrian conflicts and to increase pedestrian and bicycle safety, as part of design review and conditions of approval. Treatments could include:
 - o Providing clear sight triangles at project driveways (i.e., free of landscaping and signage) and continuing to disallow parking on the south side of Harder Road and the west side of Mission Street.

- Installing green paint to indicate conflict areas between people biking and people driving at the project driveway and on intersection approaches along Harder Road in the study area.
- The project should coordinate with the City to provide funding for future Class IV separated bike lanes along Harder Road and Mission Boulevard along the project frontages, or in-lieu funding for similar bicycle improvements in the Project vicinity. As an interim treatment, the project should coordinate with the City to provide a striped bicycle facility along Harder Road between Jane Avenue and Dollar Street.
- The project sponsor should coordinate with the City to restripe existing marked crosswalks at Harder Road & Jane Road (#8) as high-visibility (continental) crosswalks, given that Harder Road is a pedestrian high-injury corridor as identified in the BPMP.
- The project should coordinate with the City of Hayward to determine the number and location of on-site short-term and long-term bicycle parking spaces to be provided.
- It is recommended that project tenants prioritize larger trucks (i.e., larger than a 30- or 40-foot long single unit truck) make deliveries to the site outside the peak hours (7:00-9:00 AM and 4:00-6:00 PM) when possible to avoid potential conflicts associated with turning movements at project driveways.

TABLE OF CONTENTS

1	METHODOLOGIES AND EXISTING CONDITIONS.....	4
1.1	Intersection Level of Service Standards.....	6
1.1.1	Signalized Intersections	6
1.1.2	Unsignalized Intersections	6
1.1.3	Level of Service Definitions	6
1.1.4	Study Intersections	7
1.2	Existing Network.....	9
1.2.1	Roadways	9
1.2.2	Transit Service.....	12
1.2.3	Pedestrian Facilities	15
1.2.4	Bicycle Facilities	18
1.3	Existing Traffic Volumes	20
1.3.1	Automobile Traffic Volumes	20
1.3.2	Pedestrian and Bicycle Volumes	27
1.4	Performance	28
1.4.1	Traffic Signal Warrants.....	28
1.4.2	Automobile Level of Service	30
1.4.3	Queue Storage	31
2	PROJECT DESCRIPTION	33
3	PROJECT TRIP GENERATION AND DISTRIBUTION.....	35
3.1	Trip Generation.....	35
3.2	Trip Distribution and Assignment.....	37
4	EXISTING PLUS PROJECT TRAFFIC CONDITIONS.....	40
4.1	Existing Plus Project Automobile Level of Service	40
4.2	Existing Plus Project Queue Storage	44
5	CUMULATIVE 2040 PLUS PROJECT CONDITIONS	46
5.1	Development of Cumulative 2040 Demand.....	46
5.2	Cumulative 2040 Plus Project Automobile Level of Service	49
5.3	Cumulative 2040 Plus Project Queue Storage	52
6	PUBLIC TRANSIT, PEDESTRIAN, AND BICYCLE ASSESSMENT	55
6.1	Transit Assessment	55
6.2	Pedestrian Assessment	55
6.3	Bicycle Assessment	56
7	PARKING ANALYSIS	58
8	CIRCULATION AND ACCESS.....	59
8.1	Truck and Delivery Van Access	59
8.2	Passenger Vehicles.....	59
8.3	Pedestrians and Bicyclists	60
9	SUMMARY OF FINDINGS.....	62

LIST OF FIGURES

Figure 1: Study Area and Project Site	5
Figure 2: Intersection Study Locations.....	8
Figure 3: Existing Traffic Signals	11
Figure 4: Existing Transit Network	14
Figure 5: Existing Crosswalk Ramps	17
Figure 6: Existing Bikeway Network.....	19
Figure 7: Existing Automobile Peak Hour Volumes (Weekday AM and PM Peak Hours).....	26
Figure 8: Site Plan.....	34
Figure 9: Project Trip Distribution Percentages.....	38
Figure 10: Project Automobile Peak Hour-Only Trips (Weekday AM and PM Peak Hours)	39
Figure 11: Existing Plus Project Turning Movement Forecasts (Weekday AM and PM Peak Hours) ..	45
Figure 12: Cumulative 2040 Turning Movement Forecasts (Weekday AM and PM Peak Hours)	47
Figure 13: Cumulative 2040 Plus Project Turning Movement Forecasts (Weekday AM and PM Peak Hours).....	48
Figure 14: Truck Turning Template Analysis	61

LIST OF TABLES

Table 1: Level of Service Standards	7
Table 2: Study Intersections.....	7
Table 3: Existing AC Transit Weekday Service	12
Table 4: Pedestrian Facility Conditions	15
Table 5: Historical Counts at Study Intersections	21
Table 6: Mission Boulevard / Harder Road Intersection Volumes.....	22
Table 7: Adjusted Existing 2020 Weekday AM Peak Hour Counts	23
Table 8: Adjusted Existing 2020 Weekday PM Peak Hour Counts.....	24
Table 9: Former Kmart Trip Generation Estimate	25
Table 10: Pedestrian and Bicycle Volumes (Weekday AM Peak Hour)	27
Table 11: Pedestrian and Bicycle Volumes (Weekday PM Peak Hour).....	28

Table 12: Traffic Signal Peak Hour Warrants, Existing Conditions.....	30
Table 13: Automobile Level of Service, Existing Conditions	30
Table 14: Queue Lengths in Excess of Capacity, Existing Conditions.....	32
Table 15: Project Trip Generation Rates.....	36
Table 16: Project Net-New Trip Generation Estimate	36
Table 17: Automobile Level of Service, Existing Plus Project Conditions	41
Table 18: Traffic Signal Peak Hour Warrants, Existing Plus Project Conditions.....	43
Table 19: Queue Lengths in Excess of Capacity, Existing Plus Project Conditions.....	44
Table 20: Automobile Level of Service, Cumulative 2040 No Project and Plus Project Conditions	49
Table 21: Traffic Signal Peak Hour Warrants, Cumulative Plus Project Conditions.....	51
Table 22: Queue Lengths in Excess of Capacity, Cumulative 2040 Plus Project Conditions.....	52

APPENDIXES

Appendix 1: Traffic Counts and Adjustment Calculations

Appendix 2: Existing Level of Service, Queue, and Peak Hour Traffic Signal Warrant Worksheets

Appendix 3: Intersection Queue Spreadsheets

Appendix 4: Existing Plus Project Level of Service, Queue, and Peak Hour Traffic Signal Warrant Worksheets

Appendix 5: Cumulative 2040 Level of Service, Queue, and Peak Hour Traffic Signal Warrant Worksheets

Appendix 6: Cumulative 2040 Plus Project Level of Service, Queue, and Peak Hour Traffic Signal Warrant Worksheets

Appendix 7: Alameda CTC Development Review Complete Streets Checklist

Appendix 8: Traffic Simulation Memorandum

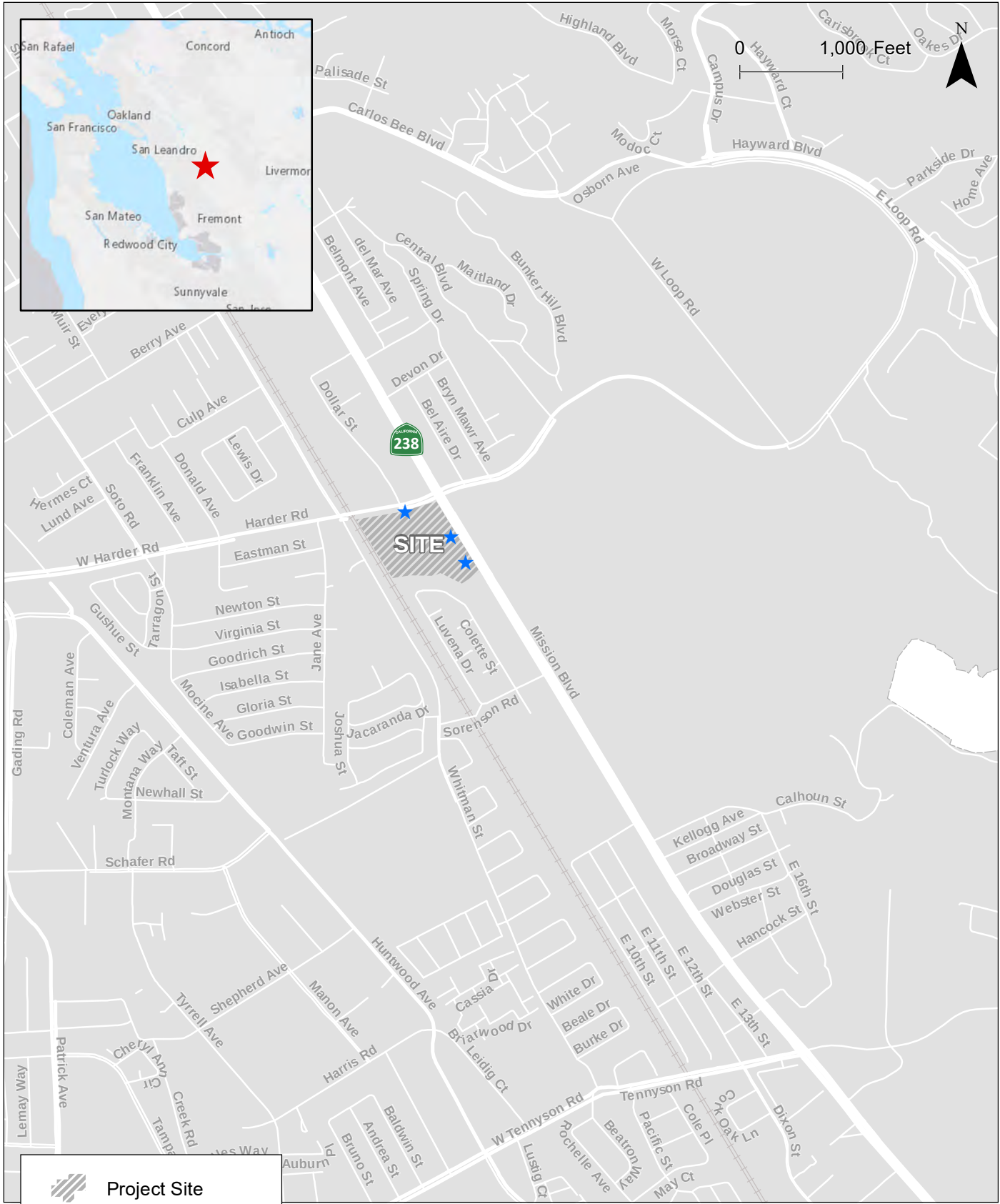
1 METHODOLOGIES AND EXISTING CONDITIONS

The project is located at the former Kmart site at 26231 Mission Boulevard at the southwest corner of Mission Boulevard / Harder Road. The project site and study area are illustrated in Figure 1.

This local transportation analysis is subject to the regulations and standards currently in place (or in place when the project's Planning Application was deemed complete) in the City of Hayward. These standards are outlined in the *Hayward 2040 General Plan – Mobility Element* (2014) and the City of Hayward Interim Traffic Study Guidelines (March 2017).

The analysis methodology used in this report was submitted in a scoping memo and approved by City Transportation Staff prior to commencement of the study.

H:\2525541 - Hayward Kmart Site Development\ER\GIS\Figure 01 Study Area and Project Site_25541_v3.mxd - garsky - 6:06 PM 1/22/2021



-  Project Site
-  Project Site (Inset)
-  Project Driveways

**Study Area and Project Site
Hayward, California**

**Figure
1**

1.1 INTERSECTION LEVEL OF SERVICE STANDARDS

Goal 4 Local Circulation-M-4.3 of the City of Hayward's 2040 General Plan requires intersections to maintain a peak-hour level of service (LOS) of E or better for signalized intersections. M-4.3 describes this as follows: The City shall maintain a minimum Level of Service E at signalized intersections during the peak commute periods except when a LOS F may be acceptable due to costs of mitigation or when there would be other unacceptable impacts, such as right-of-way acquisition or degradation of the pedestrian environment due to increased crossing distances or unacceptable crossing delays.

Under SB 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, LOS is included for non-CEQA purposes to determine if local intersections operate acceptably and if the project would result in any operational deficiencies on the local roadway network. This approach is consistent with the City's adopted thresholds of significance and screening criteria.

1.1.1 Signalized Intersections

Signalized intersection improvements should be identified if the project would degrade the AM or PM peak hour conditions from an acceptable LOS E or better under the No Project scenario to an unacceptable LOS F under the Plus Project scenario. The exception to this criterion is when LOS F is determined by the City of Hayward as acceptable due to right-of-way constraints or when there would be unacceptable impacts to other modes of travel, such as bicycle, pedestrian, or transit.

In addition, improvements should be identified at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more in the intersection's average control delay.

1.1.2 Unsignalized Intersections

At unsignalized intersections, the need for improvements is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant.

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

1.1.3 Level of Service Definitions

In this report, LOS is based on the Highway Capacity Manual (HCM) 6th edition definitions, included as Table 1 for ease of reference. The HCM methodology assigns a level of service (LOS) grade to an

intersection based on the delay for vehicles at the intersection, ranging from LOS A to LOS F; LOS A signifies very slight delay with no approach phase fully utilized while LOS F signifies very high delays and congestion, frequent cycle failures, and long queues. For signalized and all-way stop-controlled intersections, the average control delay for all vehicles is assessed; for two-way stop-controlled intersections, the intersection approach with the highest delay is utilized.

Table 1: Level of Service Standards

Level of Service	Delay Per Vehicle (Seconds)	
	Signalized Intersection	Unsignalized Intersection
A	< 10.0	< 10.0
B	> 10.0 to 20.0	> 10.0 to 15.0
C	> 20.0 to 35.0	> 15.0 to 25.0
D	> 35.0 to 55.0	> 25.0 to 35.0
E	> 55.0 to 80.0	> 35.0 to 50.0
F	> 80.0	> 50.0

Source: Highway Capacity Manual

1.1.4 Study Intersections

A total of nine study intersections (listed in Table 2 and shown in Figure 2) were selected for the purposes of this analysis. All study intersections are under the City of Hayward's jurisdiction and were selected based on discussions with City staff.

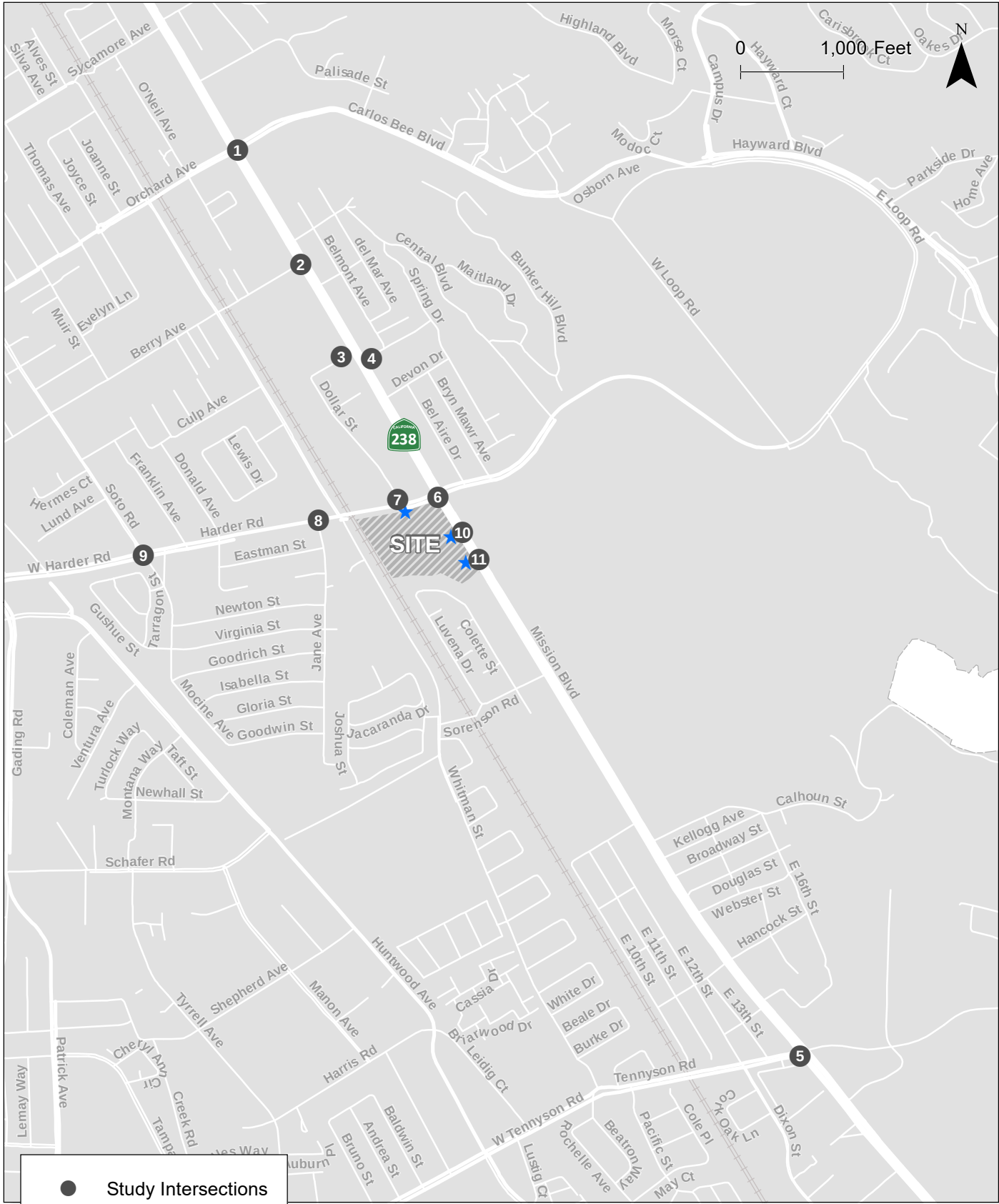
Table 2: Study Intersections

#	Intersection	Traffic Control
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	Signal
2	Mission Boulevard & Berry Avenue	Signal
3	Mission Boulevard & Torrano Avenue (North)	TWSC
4	Mission Boulevard & Torrano Avenue (South)	TWSC
5	Mission Boulevard & Tennyson Road	Signal
6	Mission Boulevard & Harder Road	Signal
7	Harder Road & Dollar Street	TWSC
8	Harder Road & Jane Avenue	Signal
9	Harder Road & Soto Road	Signal

Note: TWSC signifies a two-way stop-controlled intersection.

Source: June 2, 2016 counts Harder Elementary School Expansion Study; September 8, 2016 counts Hayward Mission Crossings study; April 10, 2019 counts, One Subaru study (Mission Boulevard / Harder Road) and Meta Housing Study (Mission Boulevard / Tennyson Road)

H:\25125541 - Hayward Kmart Site Development\ElR\GIS\Figure 02 Study Intersections Locations_25541.mxd - gcansky - 6:08 PM 1/22/2021



Study Intersections

Site Driveways

Project Site

Study Intersections Locations
Hayward, California

Figure
2

1.2 EXISTING NETWORK

1.2.1 Roadways

The roadway system in the study area consists of arterial, collector, and local roadways that serve local and regional traffic demand. The vehicular facilities in the study area are discussed below. Signalized intersections in the study area are shown in Figure 3.

Arterial Roadways

Mission Boulevard is a north-south facility that is classified as a Principal Arterial and designated as a truck route by the City of Hayward. Mission Boulevard runs from Interstate 680 in Fremont to the Interstate 580/Interstate 238 interchange in Castro Valley. Also known as State Route 238 (SR 238), the road splits into two one-way roads north through downtown Hayward: Foothill Boulevard heading northbound and Mission Boulevard heading southbound. Within the study area, Mission Boulevard is a six-lane facility with a center median south of Industrial Parkway. North of Industrial Parkway, Mission Boulevard is primarily a four-lane facility with a center median but widens to a six-lane facility at the intersection approaches and departures at Tennyson Road and Industrial Parkway. Travel lanes are typically 11 feet wide, and on-street parking is available when the facility is four lanes wide. The curb-to-curb right-of-way is approximately 80 feet and widens up to 106 feet at its widest around intersections. The posted speed limit is 40 miles per hour (mph).

Harder Road is classified as a Collector east of Mission Boulevard and a Minor Arterial west of Mission Boulevard; it is also classified as a truck route west of Mission Boulevard. There are two 11- to 16-foot travel lanes in each direction as well as a median. The curb-to-curb right of way varies from 80 to 90 feet. East of Mission Boulevard there is a significant uphill grade of 8% traveling eastbound. The posted speed limit is 35 mph.

Tennyson Road is an east-west Principal Arterial and truck route (west of Mission Boulevard) that runs from Mission Boulevard west to the South Hayward Bay Area Rapid Transit (BART) station, Interstate 880, and Industrial Boulevard. East of Mission Boulevard, Tennyson Road is classified as a local road and connects to one of the proposed project access points. The road is a four-lane facility with a center median within the study area. Travel lanes are typically 12 feet wide, and there is on-street parking available on both sides of the roadway. The curb-to-curb right-of-way is approximately 90 feet wide. The posted speed limit varies between 25 and 35 mph.

Collector Roadways

Whitman Street is a north-south Collector that runs from Tennyson Road north toward Jackson Street, running parallel to the BART railroad tracks. The road connects to several schools, including Cesar Chavez Middle School, Tennyson High School, and Harder Elementary School. The road is a two-

lane undivided facility with 11-foot travel lanes and on-street parking on both sides of the road. The curb-to-curb right-of-way is approximately 44 feet. The posted speed limit is 25 mph.

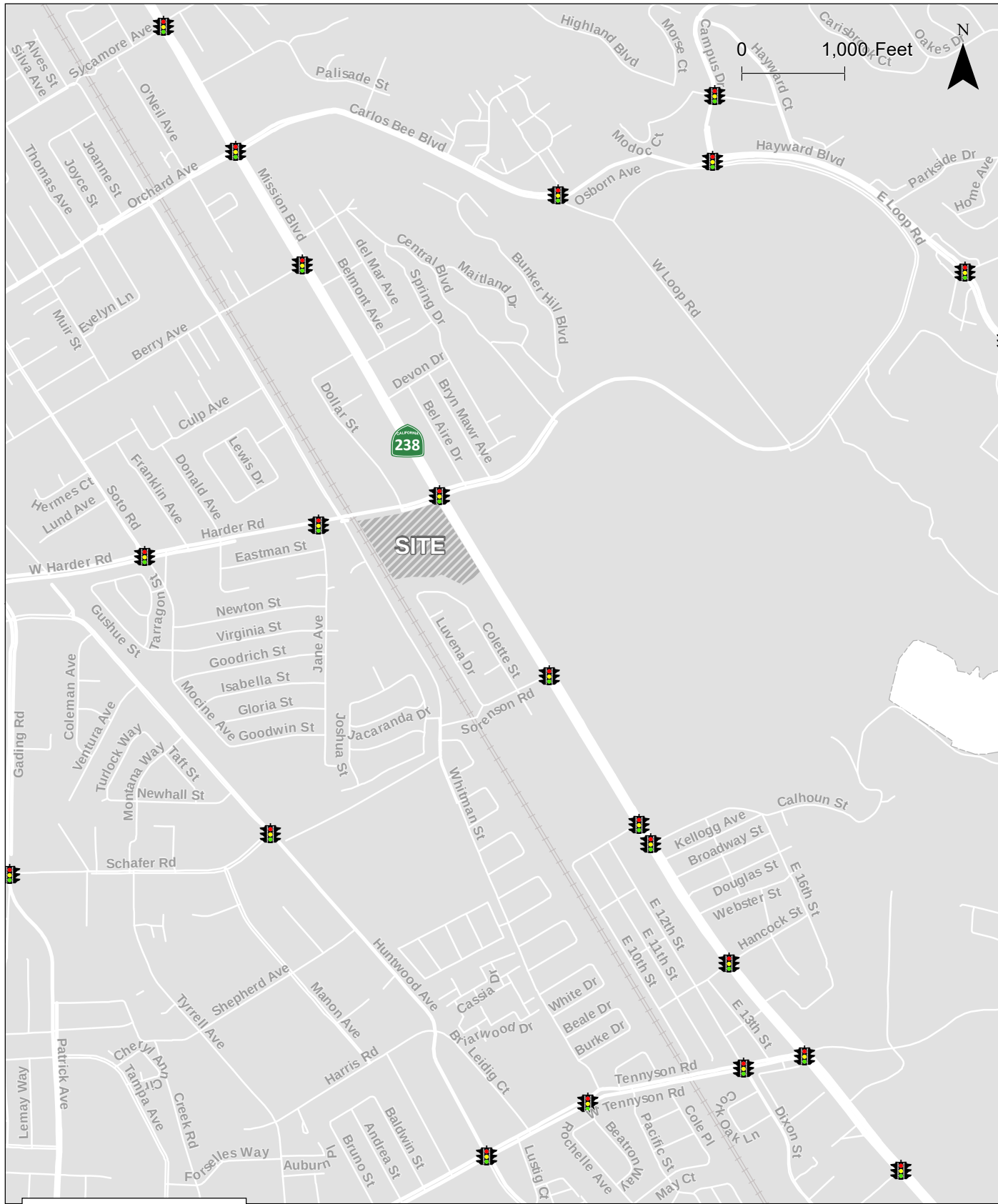
Soto Road is a north-south collector road that connects to Harder Road to the south and terminates at Winton Avenue to the north, providing access to residential areas and State Route 92 (Jackson Street). It has one travel lane in each direction. Sidewalks are provided along both sides of the street. On-street parking is allowed along the majority of the road.

Local Roadways

Jane Avenue starts at Whitman Street, runs through Harder Road, and terminates at a cul-de-sac of a residential development south of Harder Road. It has one travel lane in each direction except along the short stretch providing access between Harder Road and Whitman Street, where two lanes are present in each direction. Sidewalks are provided on both sides of the street. On-street parking is allowed south of the intersection with Harder Road.

Dollar Street is a north-south local road west of Mission Boulevard that runs from Torrano Road and terminates at the project site at Harder Road. Dollar Street has one lane in each direction and a short segment with a two-way left turn lane. On-street parking is allowed on Dollar Street, and the curb-to-curb right-of-way is about 45 feet, with short sections somewhat wider. Dollar street is stop controlled at Harder Road with a marked east-west pedestrian crossing at the intersection.

H:\2525541 - Hayward Kmart Site Development\ER\GIS\Figure 03 Traffic Signals.mxd - garsky - 6:16 PM 12/22/2021



 Traffic Signals

 Project Site

Existing Traffic Signals
Hayward, California

Figure
3

1.2.2 Transit Service

The transit system in the study area consists of local bus and regional rail service. The transit facilities in the study area are discussed below and shown in Figure 4.

Alameda-Contra Costa Transit District

Alameda-Contra Costa Transit District (AC Transit) provides bus service in the study area. AC Transit bus routes and local bus stops are shown in Figure 4. In addition, weekday bus service in the study area is documented in Table 3.

Table 3: Existing AC Transit Weekday Service

Route	Beginning and End Points		Peak / Off-Peak Frequency (in Minutes)
	North/West	South/East	
99	Hayward BART	Fremont BART	20/20
801	San Leandro BART	Fremont BART	N/A / 30
41	Hayward BART	Union Landing Transit Center	60/60

Source: AC Transit, January 2021

There are two bus lines that run along Mission Boulevard in the study area. AC Transit Line 99 runs along Mission Boulevard on weekdays between 5:00 AM and 11:59 PM (starting at 6:00 AM on weekends and with 30-minute headways), with connections to the Hayward BART and South Hayward BART stations, before turning south onto Decoto Road into Union City and the Union City BART station, and then heads east onto Fremont Boulevard into Fremont and the Fremont BART station. AC Transit Line 801 (an “All-Nighter” route) provides daily service to San Leandro, Hayward, Union City, and Fremont primarily along Mission Boulevard between 12:00 AM and 7:00 AM primarily along Mission Boulevard during the hours that Line 99 does not run. As a result, there is 24-hour bus service along Mission Boulevard.

There is one southbound bus stop near the project along Mission Boulevard immediately south of Harder Road and north of the project site’s north Mission Boulevard driveway. There are two northbound bus stops along Mission Boulevard near the project; one is located about 250 feet north of Harder Road and one is located about 1,000 feet south of Harder Road (just south of the project site’s southernmost Mission Boulevard driveway). At the stop north of Harder Road, there is a transit shelter with covered benches and lighting. At the other two stops, there are no amenities for transit users other than a bus stop sign with the route numbers.

Line 41 also runs in the project’s vicinity in the study area and provides service between Union Landing Transit Center and Hayward BART. The line runs north-south along primarily Whitman Street (north of the project site) and Huntwood Avenue (south of the project site). The closest Line 41 stops to the project site are on Whitman Street north of Harder Road. Pedestrian access to these two bus stops to and from the project site would require walking along Harder Road under the Whitman

Street overpass and traveling north along Jane Avenue. At these two stops, there are no amenities for transit users other than a bus stop sign with the route numbers.

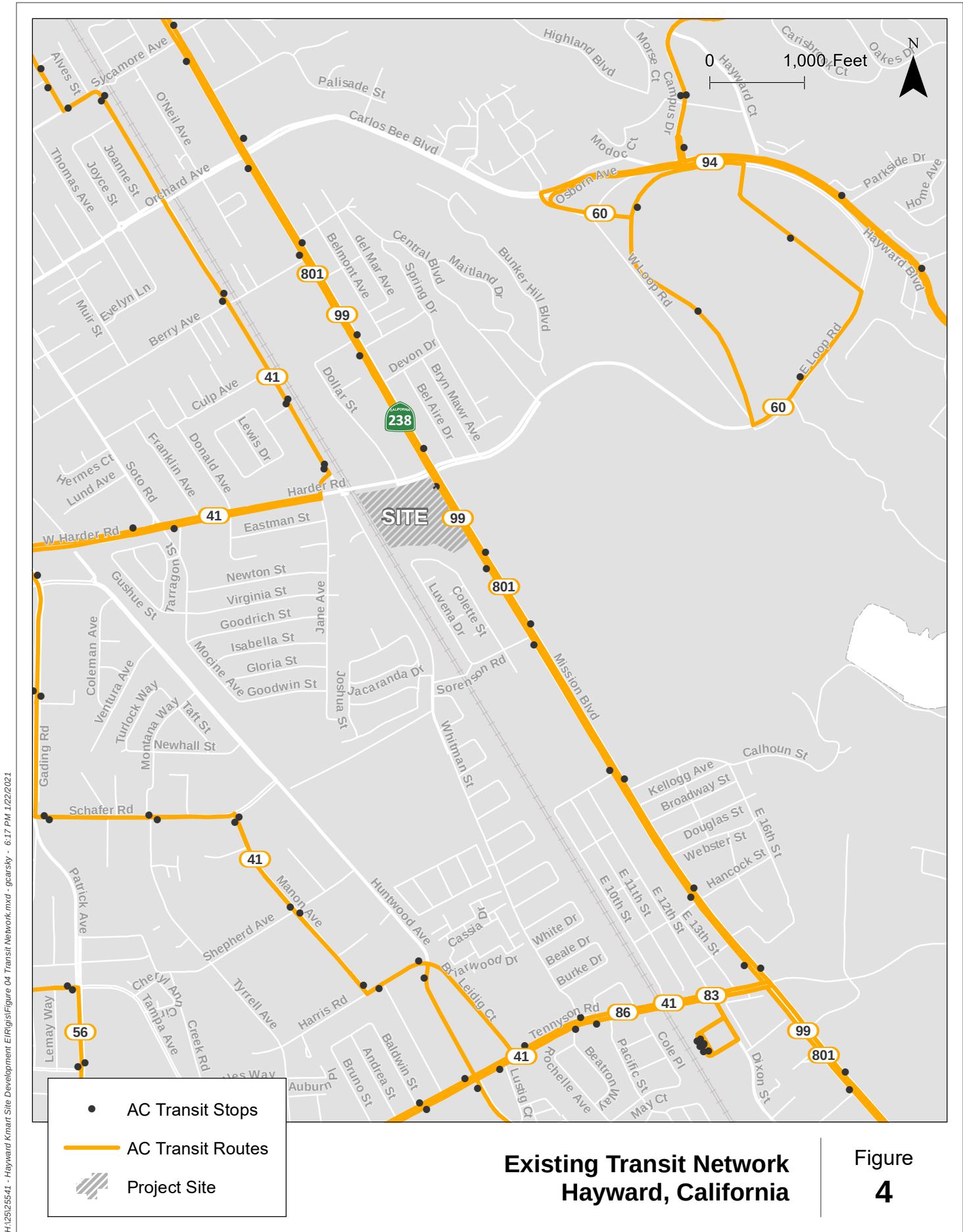
Bay Area Rapid Transit

The South Hayward Bay Area Rapid Transit (BART) station near the Mission Boulevard/Tennyson Road intersection is a major transit hub and a key transfer point for BART-to-bus and bus-to-bus connections. There are nine bus bays serving four AC Transit routes at the South Hayward BART station. BART operates regional heavy rail service connecting San Francisco, San Mateo, Alameda and Contra Costa Counties. The Berryessa-Richmond and Berryessa-Daly City lines run through the South Hayward BART station. Each line generally operates at 15-minute headways during peak periods, resulting in an average peak period frequency of 7.5 minutes at the station. However, due to the ongoing COVID-19 pandemic, each line currently operates on longer 30-minute headways.

The South Hayward BART station is approximately 1.2 miles to the south of the proposed project site by foot.

Other Transit Services

The Hayward Greyhound bus station is located 1.8 miles north of the study area at the Hayward BART station. In addition, the Hayward Amtrak Station is located approximately 2.3 miles northwest of the project site; the Hayward Amtrak station is part of the Capitol Corridor operating between San Jose and Sacramento.



H:\2525541 - Hayward Kmart Site Development\ER\GIS\Figure 04 Transit Network.mxd - gcursky - 6:17 PM 1/22/2021

1.2.3 Pedestrian Facilities

The study area offers several types of facilities and amenities that support walking. The availability and quality of pedestrian facilities can be analyzed using seven key factors as shown in Table 4.

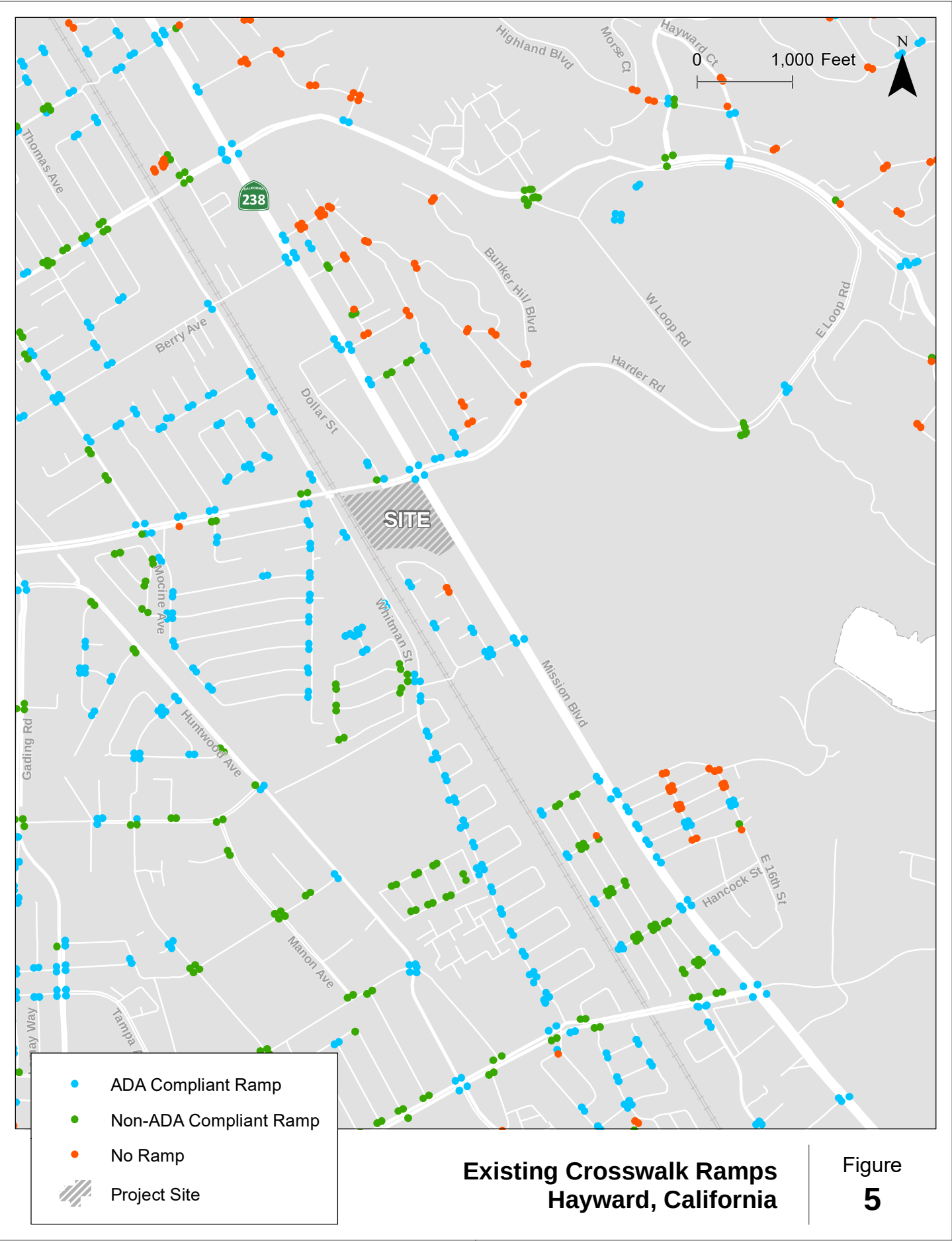
Table 4: Pedestrian Facility Conditions

Factor	Description	Assessment
 Sidewalk Availability	Sidewalk availability is core to supporting walkability and safety separating pedestrians from vehicles and other modes. In addition, it is important that sidewalks are present on <u>both sides</u> of the roadway and are available along the entire segment rather than end midblock.	The Arterial roadways within the study area have sidewalks on both sides of the roadway with no gaps. For the most part, Collector roadways have complete sidewalk coverage, as well. The Local roads in the study area generally have complete sidewalks.
 Sidewalk Conditions	Cracked, broken, or otherwise damaged sidewalks can pose a safety hazard and discourage walking.	Where sidewalks exist, they are generally in good condition free of cracks, breaks, or visible damage.
 Crosswalk Availability	Marked crosswalks can safely accommodate pedestrians that need to cross streets. A lack of marked crosswalks could hinder walkability since pedestrians need to travel greater distances to reach a safe marked crossing point. Drivers may also be less likely to yield to intersections at unmarked crossings.	Within the study area, there are marked crosswalks at all signalized intersections. Along Harder Road, the unsignalized intersections include marked crossings across the minor streets only (i.e., not across Harder). One marked crosswalk with a Rectangular Rapid Flashing Beacon is provided on the west leg of the Harder Road & Franklin Avenue intersection. All of the marked crossings on Mission Boulevard are high-visibility continental crosswalks with curb ramps and detectable warning strips with tactile domes. The following marked crossings along Harder Road are also high-visibility continental crossings: • The north leg of Harder Road & Dollar Street. The northwest corner does not include a detectable warning strip on the curb ramp. • The west leg of Harder Road & Franklin Street. The southern end of the crossing does not include a curb ramp but ends partially in a driveway. The following marked crossings along Harder Road have basic transverse markings, painted yellow to indicate the presence of a school: • All crossings at Harder Road & Soto Road • North leg of Harder Road & Franklin Street • North and south legs of Harder Road & Donald Avenue/Eastman Court. The southwest corner does not include a detectable warning strip on the curb ramp. • All four legs of Harder Road & Jane Avenue and Harder Road & Soto Road. The northwest and northeast

Factor	Description	Assessment
		corners at Jane Avenue do not include detectable warning strips on the curb ramps. The southwest corner at Soto Road is the only corner in the study area that includes directional curb ramps for crossings. As shown in Figure 5, most intersections in the study area have Americans with Disabilities Act (ADA) compliant curb ramps with tactile strips.
 Shading	Shading, whether natural or artificial, can encourage walking in areas such as Southern California which are relatively warm with limited rainfall, especially in the summer.	Mission Boulevard, with its wide right-of-way, generally lacks shade for pedestrians, especially on the east side of the road. Other arterials, such as Harder Road, have more intermittent shade from street trees. Several Collector and Local roadways have ample shade for pedestrians from street trees or buildings.
 Flat Grade	Steep hills and ravines can discourage walking, especially for pedestrians with limited mobility.	The streets to the west of Mission Boulevard around the study area are generally flat with mild inclines or declines for short stretches. The roads to the east of Mission Boulevard slope upward at a fairly steep angle for pedestrians, which affects east-west pedestrian accessibility from Mission Boulevard. The north-south roads to the east of Mission Boulevard are relatively flat.
 Buffer	Buffers which provide separation between pedestrians and moving vehicles can help improve the walking experience, and can include landscaping, parked vehicles, and bulbouts, which serve to both reduce pedestrian crossing distances at intersections and as a traffic calming measure.	None of the Arterial roadways include a buffer. The other roadways in the study area generally lack buffers, though some local and collector streets include on-street parking which provide a buffer from moving traffic. Some of the residential, lower-volume streets to the east of Mission Boulevard have intermittent landscape buffers.
 Amenities	In addition to physical facilities that accommodate walking, useful or interesting amenities along sidewalks create a more interesting walking environment and increase pedestrian comfort. Amenities can include sidewalk-adjacent retail and restaurants, landscaping, and street furniture.	Street furniture is broadly lacking along the roadways in the study area. As outlined in the transit section above, four of the five the bus stops in the immediate project vicinity do not provide any amenities other than a bus stop sign. The arterial roadways in the study area are surrounded by single-family homes, low-rise residential homes, a cemetery, or commercial development that is not amenable to walking (e.g., gas stations, storage facilities). The remaining roadways in the study areas are surrounded by parks and single-family homes.

The City's 2020 BPMP identifies Harder Road, west of the project site between Whitman Street and Soto Road, as a high injury corridor for pedestrians. The BPMP also includes the Harder Road segment between Santa Clara Street and Loop Road (i.e., the full extent of Harder Road) among its near-term implementation corridors, with recommended treatments along the corridor.

H:\25125541 - Hayward Kmart Site Development EIR\GIS\Figure 05 Existing Crosswalk Ramps.mxd - gcrnsky - 6:19 PM 1/22/2021



1.2.4 Bicycle Facilities

The study area contains a bicycle facilities network that consists primarily of dedicated street space for bicyclists.

Bicycle facilities are categorized into four types, as described below:

- **Class I Bikeway (Bike Path).** Also known as a shared path or multi-use path, a bike path is a paved right-of-way for bicycle travel that is completely separate from any street or highway.
- **Class II Bikeway (Bike Lane).** A striped and stenciled lane for one-way bicycle travel on a street or highway. This facility could include a buffered space between the bike lane and vehicle lane and the bike lane could be adjacent to on-street parking.
- **Class III Bikeway (Bike Route).** A signed route along a street where the bicyclist shares the right-of-way with motor vehicles. This facility can also be designated using a shared-lane marking (sharrow).
- **Class IV Bikeway (Separated Bike Lane).** A bikeway for the exclusive use of bicycles including a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

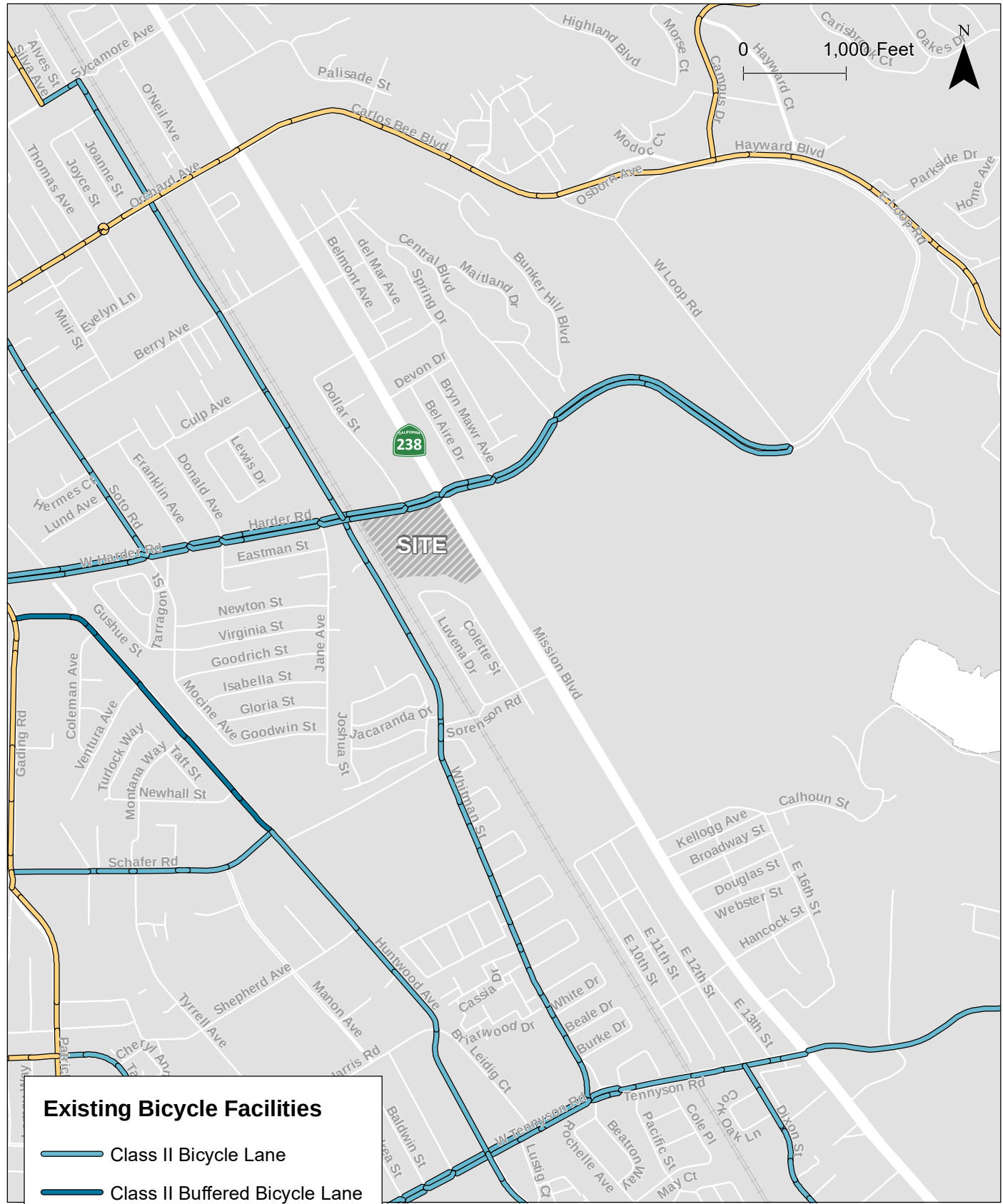
Figure 6 displays the existing designated bicycle facilities in the study area. The existing bicycle facilities near the project site include:

- Class II bicycle lanes on Harder Road in both directions
- Class II bicycle lanes on Whitman Street in both directions
- Parking-adjacent Class II bicycle lanes on Soto Road between Harder Road and Orchard Avenue
- Class III bicycle route on Orchard Avenue / Carlos Bee Boulevard
- Class II buffered bicycle lanes on Huntwood Avenue

The City's BPMP includes the following recommended bicycle improvements in the study area:

- Class IV separated bike lanes on Mission Boulevard throughout the study area
- Class IV separated bike lanes on Harder Road throughout the study area
- Class I multi-use path or Class IV separated bike lanes on Whitman Street throughout the study area

H:\25125541 - Hayward Kmart Site Development\ElR\GIS\Figure 06 Existing Bike Network.mxd - garsky - 6:21 PM 1/22/2021



**Existing Bicycle Facilities
Hayward, California**

**Figure
6**

1.3 EXISTING TRAFFIC VOLUMES

1.3.1 Automobile Traffic Volumes

The LTA analysis involves establishing traffic volumes that capture representative existing conditions, which in this case represents typical daily volumes without the presence of the former Kmart site (closed in early 2020). However, because of the timing of the project and this analysis, any currently observed traffic volumes would be severely affected by the COVID-19 pandemic, which has influenced traffic volumes and resulted in lower than typical traffic levels as experienced before the pandemic or would be expected after the pandemic. One approach to arrive at representative traffic volumes is to obtain counts at some locations in present conditions and compare these to common study locations available in previous counts as shown in Table 5. The comparison could establish a percentage basis to adjust observed volumes to pre/post-pandemic levels.

However, available pre-COVID counts all represent conditions before Kmart closed, which makes such an adjustment imprecise because all counts prior to 2020 would reflect a baseline condition with the Kmart operational. An adjustment would therefore reflect pandemic changes and the Kmart closure. Any 2020 counts that include the project's access points currently would show negligible or no site activity and could not be properly adjusted on a percentage basis. The result would be adjusted volumes in aggregate but with misleading adjustments related to site access.

Therefore, no traffic counts taken during the COVID pandemic were used. Traffic volumes available from previous counts were identified and used for the analysis. Table 5 identifies multimodal traffic counts available that were conducted as part of previous studies:

- Harder Elementary School Expansion (2016), located at 495 Wyeth Road;
- Hayward Mission Crossings (2017), located at 25501 Mission Boulevard, on the northwest corner of Mission Boulevard and Torrano Avenue;
- One Subaru (2019), located at 25000 Mission Boulevard, on the southeast corner of Mission Boulevard and Carlos Bee Boulevard; and,
- Meta Housing (2019), located at 29497-29553 Mission Boulevard, on the west side of Mission Boulevard north of Industrial Parkway.

Table 5: Historical Counts at Study Intersections

#	Intersection	Traffic Control	Counts Available by Date		
			June 2, 2016	September 8, 2016	April 10, 2019
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	Signal		X	X
2	Mission Boulevard & Berry Avenue	TWSC		X	X
3	Mission Boulevard & Torrano Avenue (North)	TWSC		X	X
4	Mission Boulevard & Torrano Avenue (South)	TWSC		X	X
5	Mission Boulevard & Tennyson Road	Signal		X	X
6	Mission Boulevard & Harder Road	Signal	X	X	X
7	Harder Road & Dollar Street	TWSC		X	
8	Harder Road & Jane Avenue	Signal	X		
9	Harder Road & Soto Road	Signal	X		

Note: TWSC signifies a two-way stop-controlled intersection.

Source: June 2, 2016 counts Harder Elementary School Expansion Study; September 8, 2016 counts Hayward Mission Crossings study; April 10, 2019 counts, One Subaru study (Mission Boulevard / Harder Road) and Meta Housing Study (Mission Boulevard / Tennyson Road)

Kittelson compiled these historical traffic counts and arrived at Existing Conditions analysis volumes using the following methodology:

1. Compare total entering vehicles at the Mission/Harder intersection (a site collected among all available dates) across the three count dates presented in Table 5. For intersections #8 and #9 where 2016 counts are the most recent available, apply the average growth observed at other intersections from 2016 to 2019 to “bring them forward” to 2019 conditions (adjust the volumes to show three years of growth observed).
2. Use the most recently available counts for each intersection, with adjustments from Step 1 to adjust them to 2019 levels.
3. Apply a 1 percent growth factor to all volumes to adjust them from 2019 to a 2020 analysis year.

Steps 1 through 3 result in existing conditions analysis volumes that reflect area non-pandemic conditions and localized conditions before Kmart closure (i.e., some level of Kmart traffic is present). The adjusted volumes could then be used in relation to project trip generation.

4. Estimate the traffic volumes related to the former Kmart site based on the Institute of Transportation Engineers (ITE) Trip Generation Manual.
5. Compare analysis volumes at project driveways from steps 1-3 and the estimated Kmart site traffic from step 4. Use these values to estimate an appropriate credit to reduce project trip generation (discussed in next section).

Step 1: Determine Growth Factor between 2016 and 2019

The results of the comparison among Mission Boulevard / Harder Road counts are provided in Table 6. The 2019 counts were 5.6 percent higher in the AM peak hour compared to the average of 2016 counts and 15.2 percent higher in the PM peak hour. These percentages were applied to grow the volumes at intersections #6, #7, and #8.

Table 6: Mission Boulevard / Harder Road Intersection Volumes

Count Date	NB			SB			EB			WB			Total Entering	PCT Difference (2019 compared to 2016 Average)
	L	T	R	L	T	R	L	T	R	L	T	R		
Weekday AM Peak Hour														
6/2/2016	226	885	141	41	1,521	141	231	282	307	100	98	35	4,008	-
9/8/2016	261	1,160	73	15	1,740	141	269	102	362	162	101	17	4,403	-
4/10/2019	231	1,003	168	46	1,552	153	276	346	352	172	110	33	4,442	237 (5.6%)
Weekday PM Peak Hour														
6/2/2016	279	1,144	106	49	1,068	190	246	187	290	221	254	66	4,100	-
9/8/2016	263	1,504	137	52	1,167	198	324	140	343	107	119	32	4,386	-
4/10/2019	325	1,600	226	53	1,115	205	275	183	320	223	287	76	4,888	645 (15.2%)

Source: June 2, 2016 counts Harder Elementary School Expansion Study; September 8, 2016 counts Hayward Mission Crossings study; April 10, 2019 counts, One Subaru study (Mission Boulevard / Harder Road) and Meta Housing Study (Mission Boulevard / Tennyson Road)

Step 2 and 3: Adjust Volumes to 2020 Analysis Volumes

The most recent counts were all adjusted to analysis year 2020 levels to account for background growth from 2016 and from 2019. The final Existing Conditions analysis volumes are presented for each peak hour in Table 7 and Table 8.

Table 7: Adjusted Existing 2020 Weekday AM Peak Hour Counts

Intersection		Count Date	NB			SB			EB			WB			Total Entering
			L	T	R	L	T	R	L	T	R	L	T	R	
1	Mission Blvd & Carlos Bee Blvd	4/10/2019	57	1,166	179	417	1,503	158	193	267	68	357	434	273	5,072
		Final	58	1,178	181	422	1,519	160	195	270	69	361	439	276	5,128
2	Mission Blvd & Berry Ave	4/10/2019	32	1,289	3	38	1,836	52	52	3	34	21	1	5	3,366
		Final	33	1,302	4	39	1,855	53	53	4	35	22	2	6	3,408
3	Mission Blvd & Torrano Ave: North Leg	4/10/2019	0	1,343	0	0	1,753	120	0	0	21	0	0	0	3,237
		Final	0	1,357	0	0	1,771	122	0	0	22	0	0	0	3,272
4	Mission Blvd & Torrano Ave: South Leg	4/10/2019	10	1,296	15	36	1,737	1	0	0	0	8	0	29	3,132
		Final	11	1,309	16	37	1,755	2	0	0	0	9	0	30	3,169
5	Mission Blvd & Tennyson Rd	4/10/2019	196	1,287	0	8	1,657	239	329	3	248	7	5	1	3,980
		Final	198	1,300	0	9	1,674	242	333	4	251	8	6	2	4,027
6	Mission Blvd & Harder Rd	4/10/2019	231	1,003	168	46	1,552	153	276	346	352	172	110	33	4,442
		Final	234	1,014	170	47	1,568	155	279	350	356	174	112	34	4,493
7	Harder Rd & Dollar St	9/8/2016	37	5	14	22	10	169	55	760	65	14	513	12	1,676
		Final	40	6	15	24	11	181	59	811	70	15	548	13	1,793
8	Harder Rd & Jane Ave	6/2/2016	25	46	48	164	18	317	197	712	4	18	357	137	2,043
		Final	27	49	51	175	19	338	210	760	4	19	623 ¹	146	2,179
9	Harder Rd & Soto Rd	6/2/2016	109	36	23	127	28	556	243	841	67	13	707	86	2,836
		Final	116	38	25	135	30	593	259	897	71	14	754	92	3,025

¹Note: The resulting low volume of through movements from the COVID adjustments was further adjusted to rebalance counts at adjacent intersections.

Source: June 2, 2016 counts Harder Elementary School Expansion Study; September 8, 2016 counts Hayward Mission Crossings study; April 10, 2019 counts, One Subaru study (Mission Boulevard / Harder Road) and Meta Housing Study (Mission Boulevard / Tennyson Road)

Table 8: Adjusted Existing 2020 Weekday PM Peak Hour Counts

Intersection		Count Date	NB			SB			EB			WB			Total Entering
			L	T	R	L	T	R	L	T	R	L	T	R	
1	Mission Blvd & Carlos Bee Blvd	4/10/2019	77	1,617	328	358	1,272	161	111	303	44	172	258	327	5,028
		Final	78	1,634	332	362	1,285	163	113	307	45	174	261	331	5,085
2	Mission Blvd & Berry Ave	4/10/2019	49	1,944	5	60	1,404	39	30	2	20	15	1	6	3,575
		Final	50	1,964	6	61	1,419	40	31	3	21	16	2	7	3,620
3	Mission Blvd & Torrano Ave: North Leg	4/10/2019	0	1,972	0	0	1,403	52	0	0	36	0	0	0	3,463
		Final	0	1,992	0	0	1,418	53	0	0	37	0	0	0	3,500
4	Mission Blvd & Torrano Ave: South Leg	4/10/2019	18	1,912	36	75	1,361	3	1	0	8	6	0	20	3,440
		Final	19	1,932	37	76	1,375	4	2	0	9	7	0	21	3,482
5	Mission Blvd & Tennyson Rd	4/10/2019	380	1,695	1	32	1,198	328	352	4	248	9	17	2	4,272
		Final	384	1,712	2	33	1,210	332	356	5	251	10	18	3	4,322
6	Mission Blvd & Harder Rd	4/10/2019	325	1,600	226	53	1,115	205	275	183	320	223	287	76	4,888
		Final	329	1,616	229	54	1,127	208	278	185	324	226	290	77	4,943
7	Harder Rd & Dollar St	9/8/2016	64	9	24	30	2	112	66	745	51	23	540	17	1,683
		Final	75	11	28	35	3	131	77	867	60	27	629	20	1,963
8	Harder Rd & Jane Ave	6/2/2016	18	16	25	97	31	204	299	603	21	53	665	183	2,215
		Final	21	19	29	113	36	237	348	702	24	62	774	213	2,577
9	Harder Rd & Soto Rd	6/2/2016	110	64	14	89	52	295	376	995	129	22	678	151	3,205
		Final	128	74	16	104	61	343	437	1,158	150	26	789	176	3,729

Source: June 2, 2016 counts Harder Elementary School Expansion Study; September 8, 2016 counts Hayward Mission Crossings study; April 10, 2019 counts, One Subaru study (Mission Boulevard / Harder Road) and Meta Housing Study (Mission Boulevard / Tennyson Road)

Step 4: Estimate Traffic Volumes Associated with Former Kmart

The former Kmart trips were estimated using data provided by ITE land use code 815 (free-standing discount store), as shown in Table 9. The project was estimated to generate 5,020 weekday daily vehicle trips.

Table 9: Former Kmart Trip Generation Estimate

Trip Generation Rates									
Land Use	ITE Code	Rate	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Free-Standing Discount Store	815	per KSF	53.12	69%	31%	1.17	50%	50%	4.83
Trip Generation Estimates									
Land Use	ITE Code	Size (KSF)	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Free-Standing Discount Store	815	94.5	5,020	77	34	111	228	228	456
50% reduction in Existing Use Trip Estimate			2,510	-38	-17	-55	-114	-114	-228
Pass-by Reduction (17% in PM) – Applied to 50% Trip Estimate			-	n/a	n/a	n/a	-19	-20	-39
NET PROJECT TRIPS TO BE APPLIED			2,510	39	17	56	95	94	189

Source: Kittelson & Associates, Inc., 2021; ITE Trip Generation Handbook, 10th Ed.

Note: KSF = thousand square feet.

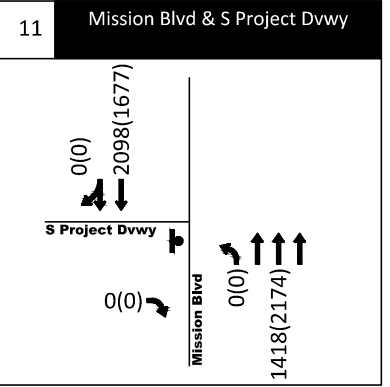
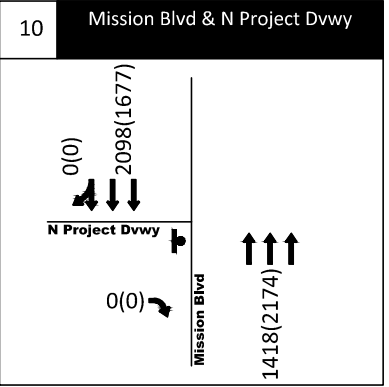
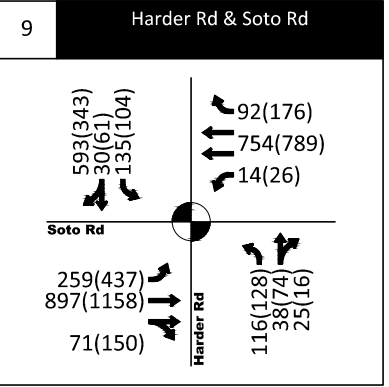
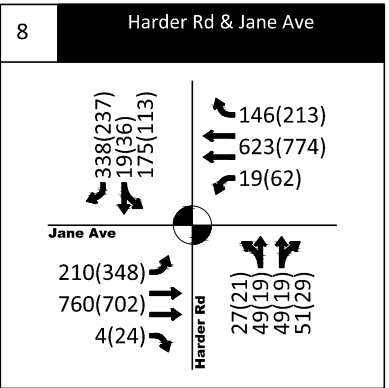
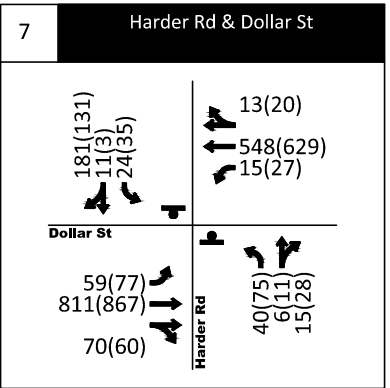
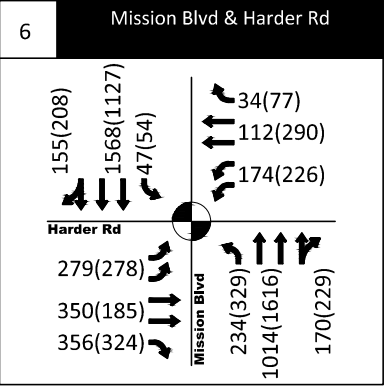
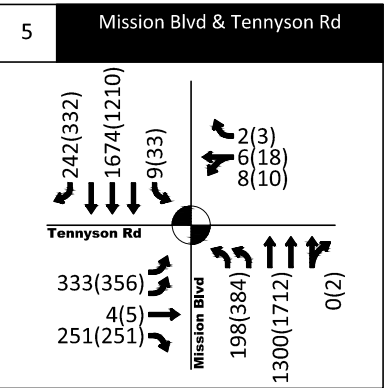
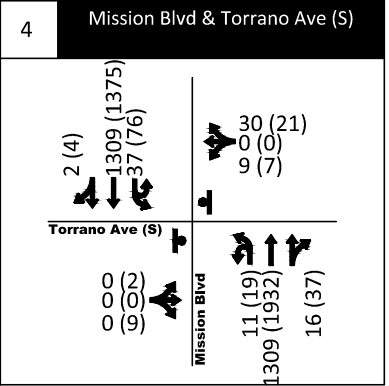
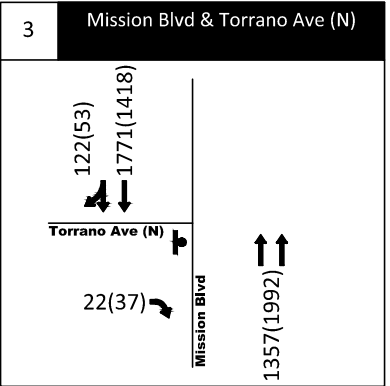
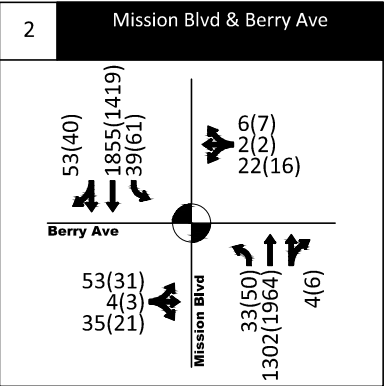
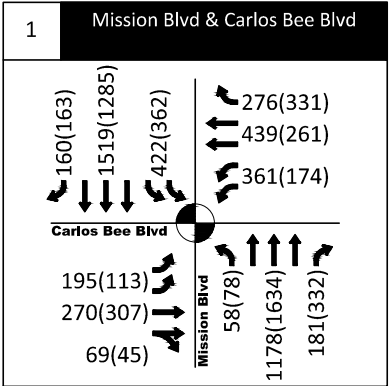
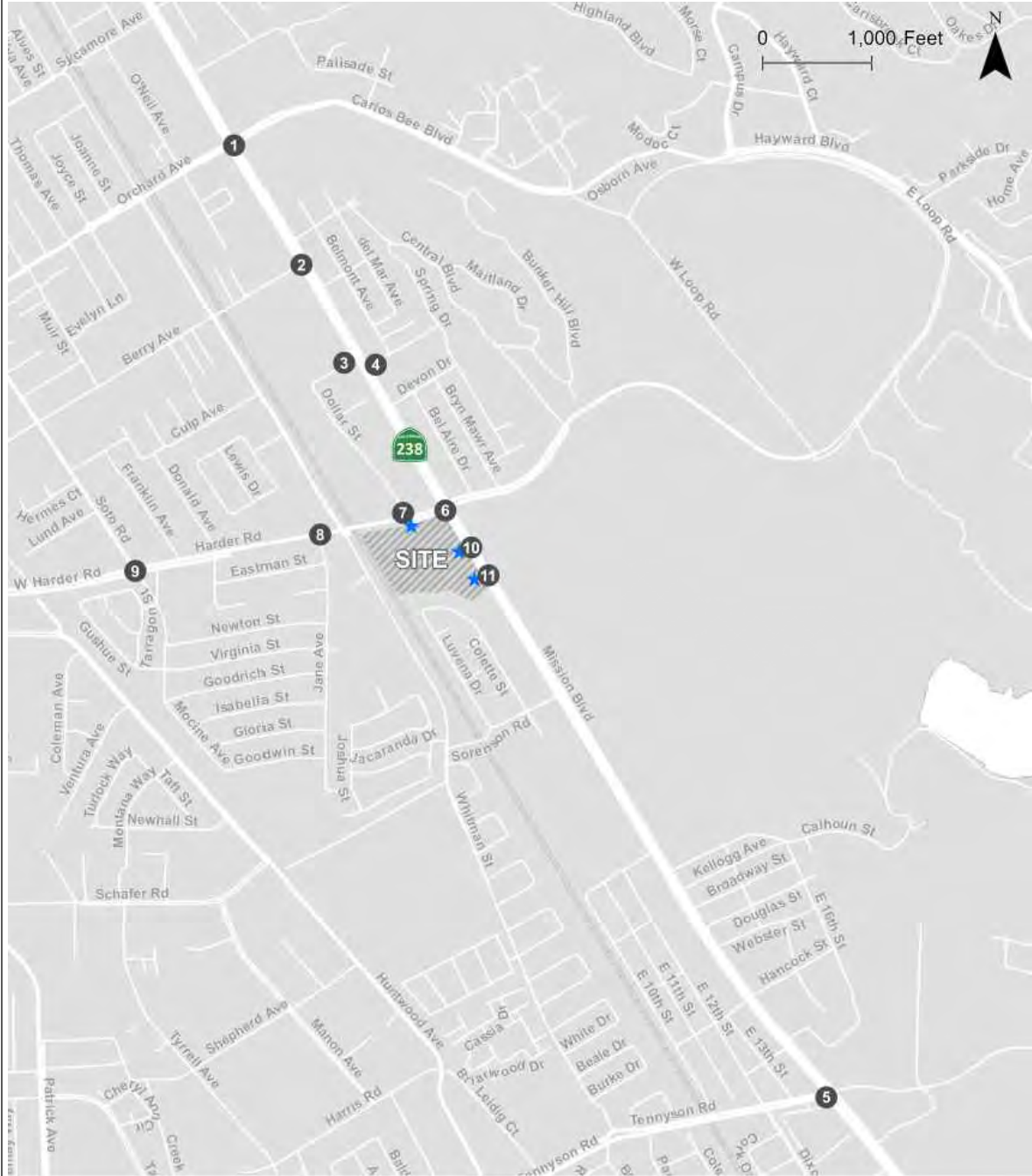
A comparison of the estimated former Kmart trip numbers to the adjusted 2016 traffic counts at the Harder Road / Dollar Street intersection provides a reasonableness check for both estimates. (The south leg of the Harder Road / Dollar Street intersection is one of three driveways for the project and former Kmart site—the other two are along Mission Boulevard—and would be expected to account for a majority of the site's in and out traffic.) The adjusted 2020 volumes at the intersection (as presented in Table 7 and Table 8) show 157 in the AM peak hour (96 in, 61 out) and 204 trips in the PM peak hour (90 in, 114 out). In the PM peak hour, these numbers are within reason for what the ITE estimates provide, given that they account for a portion of project traffic. Given the Kmart site would have been more active during the PM peak hour, the AM peak hour trip patterns seem relatively high compared to ITE estimates; it is assumed that some drivers may have been using the site as a cut-through for eastbound right turn movements.

To avoid overstating the level of travel activity at the former Kmart in the adjusted 2016 and 2019 counts, it was determined that a 50 percent trip credit would be applied to project trip generation for analysis (i.e., estimate project trips would be reduced by 50 percent to develop Existing Plus Project conditions). In addition, a pass-by reduction was applied to the trip estimates (shown in Table 9). A pass-by reduction captures visitors that would normally be passing by the site on an adjacent roadway and would instead make an intermediate stop at the project site. A PM peak hour pass-by reduction of 17 percent was applied based on the ITE Trip Generation Handbook (due to the low retail activity, no pass-by reduction was applied during the AM peak hour).

As a result, the credit totaled 2,510 daily trips credited, 56 AM peak hour trips credited (39 in, 17 out), and 189 PM peak hour trips credited (95 in, 94 out).

Step 5 is presented and discussed in Section 3.1.

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- AM(PM) - Traffic Volume
-  - All-Way Stop
 -  - Stop Sign
 -  - Traffic Signal

Existing Automobile Peak Hour Volumes (Weekday AM and PM Peak Hours)
Hayward, CA

Figure
7

1.3.2 Pedestrian and Bicycle Volumes

As mentioned in section 1.3.1 above, no new traffic counts were conducted as a part of this project due to the effects of the COVID-19 pandemic. Therefore, multimodal traffic volumes available from previous counts were identified and used for the analysis. Growth factors were developed to adjust vehicular volumes to 2020 baseline. However, no sufficient information was available to identify necessary growth factors for adjusting historic pedestrian and bicycle volumes. Therefore, historic pedestrian and bicycle volumes were used without adjustments as a part of this analysis. Table 10 and Table 11 present the pedestrian and bicycle volume data used for the weekday AM and weekday PM peak hours, respectively.

Table 10: Pedestrian and Bicycle Volumes (Weekday AM Peak Hour)

#	Intersection	Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0
2	Mission Boulevard & Berry Avenue	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0
3	Mission Boulevard & Torrano Avenue N	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
4	Mission Boulevard & Torrano Avenue S	22	2	10	14	0	1	0	0	0	0	0	0	0	0	1	0
5	Mission Boulevard & Tennyson Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mission Boulevard & Harder Road	0	1	0	0	1	0	0	1	0	1	1	1	0	1	0	0
7	Harder Road & Dollar Street	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
8	Harder Road & Jane Avenue	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9	Harder Road & Soto Road	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Data Source: Quality Counts and Metro Traffic Data historic manual turning movement counts (June 2016, September 2016, April 2019)

Table 11: Pedestrian and Bicycle Volumes (Weekday PM Peak Hour)

#	Intersection	Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	3	5	9	10	0	1	0	0	1	0	0	0	0	0	0	0
2	Mission Boulevard & Berry Avenue	2	0	2	3	0	0	0	0	2	0	0	0	0	0	1	0
3	Mission Boulevard & Torrano Avenue N	4	0	0	8	0	0	0	0	4	0	0	8	0	0	0	
4	Mission Boulevard & Torrano Avenue S	4	0	0	8	0	1	0	0	11	0	0	7	0	0	5	0
5	Mission Boulevard & Tennyson Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mission Boulevard & Harder Road	0	9	16	0	0	1	0	0	0	0	0	0	0	0	1	0
7	Harder Road & Dollar Street	4	9	0	1	1	0	0	0	0	0	1	1	0	0	0	0
8	Harder Road & Jane Avenue	0	7	1	5	0	0	0	0	0	1	0	0	0	0	1	0
9	Harder Road & Soto Road	21	0	4	0	0	0	0	0	0	0	1	2	0	0	0	0

Data Source: Quality Counts and Metro Traffic Data historic manual turning movement counts (June 2016, September 2016, April 2019)

1.4 PERFORMANCE

1.4.1 Traffic Signal Warrants

Traffic signal warrants are standards that provide guidelines in the determination of the need for a traffic signal.

As stated in 2020 California Revision 5 to the *Manual of Uniform Traffic Control Devices* (CA-MUTCD), “An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location... The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants:”¹

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.

¹ CA-MUTCD, Section 4C.01, lines 01 and 02

- Warrant 3, Peak Hour.
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- Warrant 6, Coordinated Signal System.
- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

This local transportation assessment did not evaluate all warrants for traffic signals but instead focused on the peak hour warrant. The peak hour warrant is being used in this study as an indicator of the likelihood of an existing or future unsignalized intersection warranting a traffic signal. Intersections that fail to exceed the peak hour warrant are considered (for the purposes of this impact analysis) to be unlikely to meet one or more of the other signal warrants (such as the 4-hour or 8-hour warrants). However, this does not mean that a signal is definitely unwarranted. A signal may be warranted by other criteria. This peak hour analysis is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction.

As discussed in Section 1.1, the need for improvements at unsignalized intersections is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant.

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

Regardless of intersection control, per the City of Hayward Interim Traffic Study Guidelines (2017), improvements would be required at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more in the intersection's average control delay. Unsignalized intersections were evaluated using the Peak Hour Volume Warrant (Warrant No. 3) in the CA-MUTCD. Even if the Peak Hour Volume Warrant is met, a more detailed signal warrant study is recommended before a signal is installed. The more detailed study should consider volumes during the daily peak hours of roadway traffic, pedestrian traffic, and collision histories. Table 12 presents a summary of the traffic signal warrants for the Existing Conditions scenario. Appendix 2 contains the traffic signal warrant worksheets.

As shown in Table 12, peak hour traffic signal warrants are not met in either peak hours at Mission Boulevard & Torrano Avenue (South) but are met in both peak hours at Harder Road & Dollar Street.

Table 12: Traffic Signal Peak Hour Warrants, Existing Conditions

#	Intersection	Traffic Control	Peak Hour	Warrant Met?
4	Mission Boulevard & Torrano Avenue (South)	TWSC	AM	No
			PM	No
7	Harder Road & Dollar Street	TWSC	AM	YES
			PM	YES

Based on California MUTCD (2020) Peak Hour Warrant.
Source: Kittelson & Associates, Inc. 2020

1.4.2 Automobile Level of Service

LOS at the study intersections were evaluated based on the HCM 6th Edition methodology, as implemented in the Synchro 10 software package. LOS analysis was performed for the weekday AM and PM peak hours, using traffic counts and peak hour factors as documented in Section 1.3.1. Table 13 provides a summary of the existing automobile level of service. Appendix 2 contains the Existing Conditions LOS worksheets at the study intersections.

Table 13: Automobile Level of Service, Existing Conditions

#	Intersection	Traffic Control	Weekday AM		Weekday PM	
			Delay (s)	LOS	Delay (s)	LOS
1	Mission Boulevard & Carlos Bee Boulevard	Signal	44.5	D	42.6	D
2	Mission Boulevard & Berry Avenue	Signal	15.2	B	8	A
3	Mission Boulevard & Torrano Avenue (N)	TWSC	21.8	C	17.2	C
4	Mission Boulevard & Torrano Avenue (S)	TWSC	>80	F	>80	F
5	Mission Boulevard & Tennyson Road	Signal	36.2	D	53.9	D
6	Mission Boulevard & Harder Road	Signal	65.6	E	56	E
7	Harder Road & Dollar Street	TWSC	>50	F	>50	F
8	Harder Road & Jane Avenue	Signal	23.4	C	30.3	C
9	Harder Road & Soto Road	Signal	>80	F	44.6	D

TWSC=two-way stop control
Source: Kittelson & Associates, Inc. 2020

As shown in Table 13, all study intersections operate within the standard (LOS E or better) under existing conditions, except for the following:

- **#4 Mission Boulevard & Torrano Avenue (S):**

- o This intersection operates below standard at LOS F in in existing weekday AM and PM peak periods. As indicated in Section 1.4.1, it does not meet the peak hour traffic signal warrant in either peak period in existing conditions.
- **#7 Harder Road & Dollar Street:**
 - o This intersection operates below standard at LOS F in in existing weekday AM and PM peak periods. As indicated in Section 1.4.1, it meets the peak hour traffic signal warrant in both peak periods in existing conditions.

1.4.3 Queue Storage

The 95th percentile queues at the study intersections were reviewed to identify locations where these may exceed the available storage, for informational purposes. The 95th percentile queue lengths represent queues that the top 5% longest expected to occur. This measure is typically used in traffic engineering as a conservative measure of queuing and since it only has a 5% probability of being exceeded, the average driver would likely experience shorter queue lengths than what is being reported.

For through movements and turning movements without a dedicated lane, the available storage is assumed to be the distance from the stop bar to the departure point of the nearest upstream stop-controlled or signalized intersection. For turning movements with an exclusive turn lane, the length of the turn bay is assumed to be the available storage.

Table 14 presents 95th percentile vehicle queues in excess of available storage in Existing Conditions. Appendix 2 contains Synchro queue reports, and Appendix 3 contains an intersection queue spreadsheet for all study intersections.

Table 14: Queue Lengths in Excess of Capacity, Existing Conditions

#	Intersection	Movement	Peak Hour	Spills to Adjacent Intersection?
1	Mission Boulevard & Carlos Bee Boulevard	WBL	AM	No
2	Mission Boulevard & Berry Avenue	NBT/R	PM	Yes
6	Mission Boulevard & Harder Road	EBL	AM & PM	No
7	Harder Road & Dollar Street	NBL	PM	N/A
8	Harder Road & Jane Avenue	EBL	AM & PM	No
9	Harder Road & Soto Road	NBL	AM & PM	No
		EBL	PM	No
		WBT	AM & PM	Yes

Source: Kittelson & Associates, 2021.

2 PROJECT DESCRIPTION

The project site is located at 26231 Mission Boulevard at the southwest corner of Mission Boulevard and Harder Road (assessor's parcel number 452-0020-009-01). The project would entail the development of two new drive-through restaurants and a remodel of an existing 94,500 square-foot commercial building (to be partitioned into nine commercial tenants). The site is approximately 10.5 acres in size. Although the project site is currently zoned as MB-CC (Mission Boulevard – Corridor Center), the project application was submitted and deemed complete before the July 2020 adoption of the MB-CC zoning and is subject to the former South Hayward BART Form-Based Code Urban General (S-T4) and Urban Center (S-T5) zones. The project would consist of three elements:

- An approximately 3,267 square-foot new drive-through restaurant,
- An approximately 3,879 square-foot new drive-through restaurant, and
- An approximately 88,000 square-foot existing commercial building, to be remodeled and partitioned into nine tenant spaces ranging from approximately 1,800 square feet to approximately 32,100 square feet of typical retail/commercial uses.

Vehicular access to the site would be provided by three existing driveways: two on Mission Boulevard and one on Harder Road at Dollar Street. The proposed site plan is shown in Figure 8.

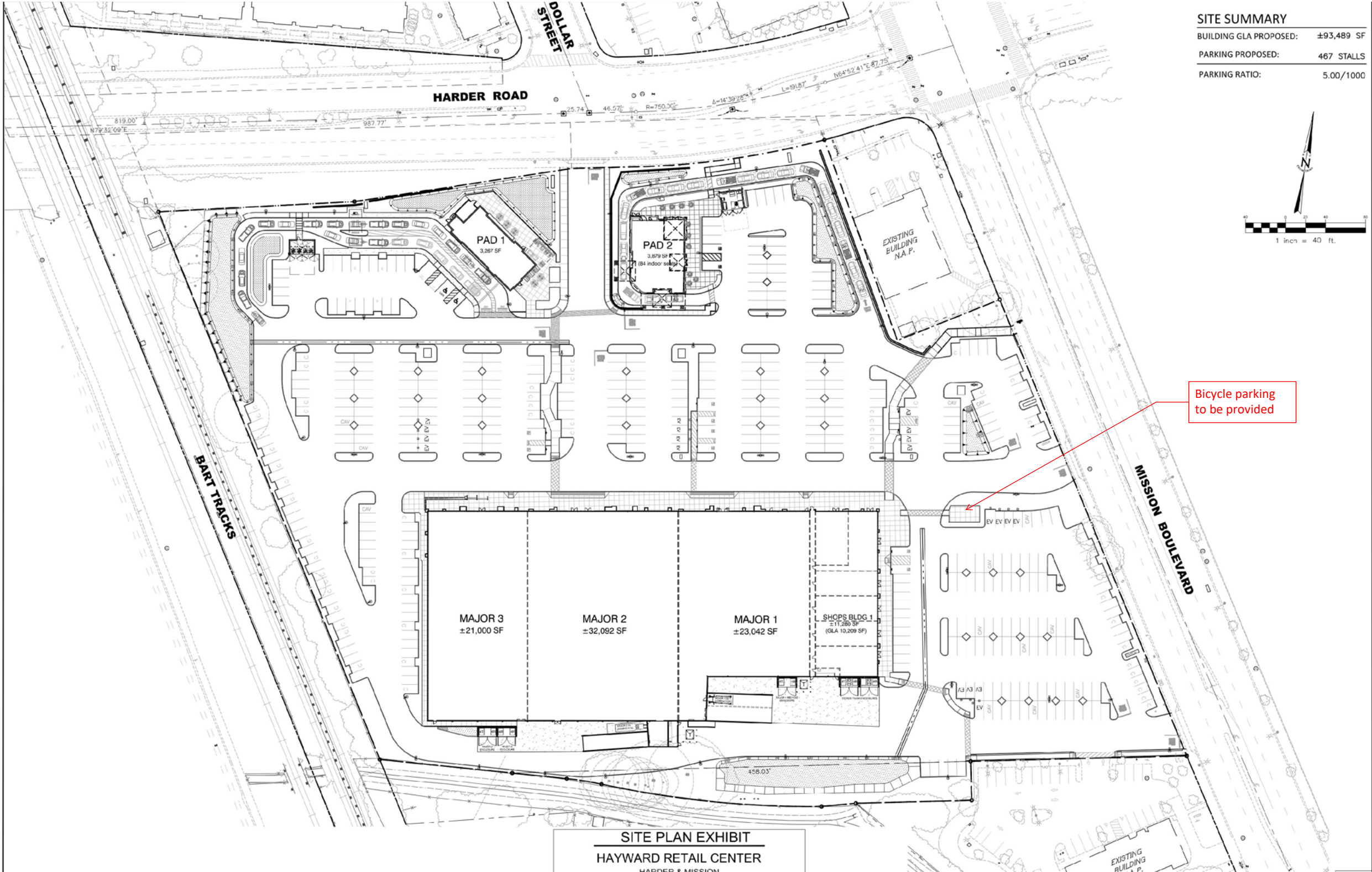


Figure 8

H:\25\25541 - Hayward Kmart Site Development ER\gis\25541_R8 site plan.mxd Date: 1/28/2021

3 PROJECT TRIP GENERATION AND DISTRIBUTION

This section provides the vehicle trip generation and distribution estimates for the proposed project.

3.1 TRIP GENERATION

Project trip generation was estimated for the following time periods:

- Weekday daily,
- Weekday AM peak hour, and
- Weekday PM peak hour.

Trips for the proposed project were estimated using data provided by ITE and shown in Table 15. As with the former Kmart trip generation, a pass-by reduction was applied to the trip generation estimates. A pass-by reduction captures visitors that would normally be passing by the site on an adjacent roadway and would instead make an intermediate stop at the project site. The pass-by reductions were applied based on data from the ITE Trip Generation Handbook.

- For the fast-food uses, AM peak hour and PM peak hour pass-by reductions of 49 percent and 50 percent were applied, respectively.
- For the shopping center use, a PM peak hour pass-by reduction of 34 percent was applied.

The resulting net-new project trip generation estimate is given in Table 16.

Table 15: Project Trip Generation Rates

Trip Generation Rates									
Land Use	ITE Code	Rate	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Shopping Center	820	per KSF	37.75	62%	38%	0.94	48%	52%	3.81
Fast Food w/ Drive-through	934	per KSF	470.95	51%	49%	40.19	52%	48%	32.67

Source: Kittelson & Associates, Inc., 2021; Institute of Transportation Engineers, 2017.

Notes: KSF signifies thousand square feet.

Table 16: Project Net-New Trip Generation Estimate

Land Use	Size (KSF)	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Existing Uses								
Free-Standing Discount Store (ITE Code 815)	94.5	5,020	77	34	111	228	228	456
50% Reduction in Existing Use Trip Estimate		-2,510	-38	-17	-55	-114	-114	-228
Pass-by Reduction (17% in PM)		n/a	n/a	n/a	n/a	-19	-20	-39
Net Existing Use Project Trips		2,510	39	17	56	95	94	189
Proposed Uses								
Shopping Center (ITE Code 820)	88	3,322	51	32	83	161	174	335
Pass-By Reduction (34% in PM)		n/a	n/a	n/a	n/a	-55	-59	-114
Fast Food w/ Drive-through (ITE Code 934)	7.15	3,367	146	141	287	122	112	234
Pass-By Reduction (49% in AM; 50% in PM)		n/a	-72	-72	-144	-61	-56	-117
Net Proposed Use Project Trips		6,689	125	101	226	167	171	338
Trip Difference (Proposed Uses Minus Existing Uses)								
Net New Trip Difference		4,179	86	84	170	72	77	149

Source: Kittelson & Associates, Inc., 2021; Institute of Transportation Engineers, 2017.

Notes: KSF signifies thousand square feet.

As shown in Table 16, with trip credits accounted for, the project is expected to generate a net total of 4,179 weekday daily vehicle trips, 170 weekday AM peak hour vehicle trips and 149 weekday PM peak hour vehicle trips. Discussion of the applicable trip credits is provided in Section 1.3.1.

3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Project trip distribution was developed using the City of Hayward General Plan model that is based on a version of the Alameda CTC Countywide Model. Within the City, the model forecasts the City buildout of land uses. Outside of Hayward, the model is based on periodic updates by Alameda CTC and allows for forecast of land developments countywide. The model is periodically updated to be consistent with the most recent land use and socioeconomic database of the Association of Bay Area Governments and assumptions of the Metropolitan Transportation Commission's regional travel demand model. The project trip distribution is based on the model's distribution of trips in and out of the traffic analysis zone (TAZ) representing the project site, as well as adjustments to reflect local travel patterns and circulation conditions. Project trip distribution and study intersections are shown in Figure 9.

The trip distribution for the project is as follows:

- 23% to/from the north via Mission Boulevard (north of Carlos Bee Boulevard)
- 21% to/from the south via Mission (south of Harder Road)
- 2% to/from the east via Carlos Bee Boulevard
- 4% to/from the west via Orchard Avenue
- 6% to/from the east via Harder Road
- 29% to/from the west via Harder Road (west of Soto Road)
- 8% to/from the south via Whitman Street and Jane Avenue
- 4% to/from the north via Soto Road
- 2% to/from the north via Dollar Street
- 1% to/from the south via local streets

All trip distribution destinations total up to 100%.

Figure 10 presents the weekday AM and PM project-only turning movements that were derived from the trip generation and trip distribution discussed in this section. These project-only volumes are used in the Existing Plus Project and Cumulative 2040 Plus Project analyses.

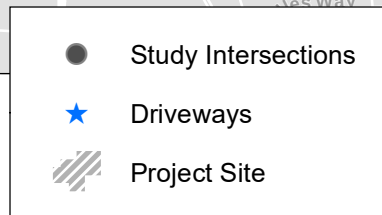
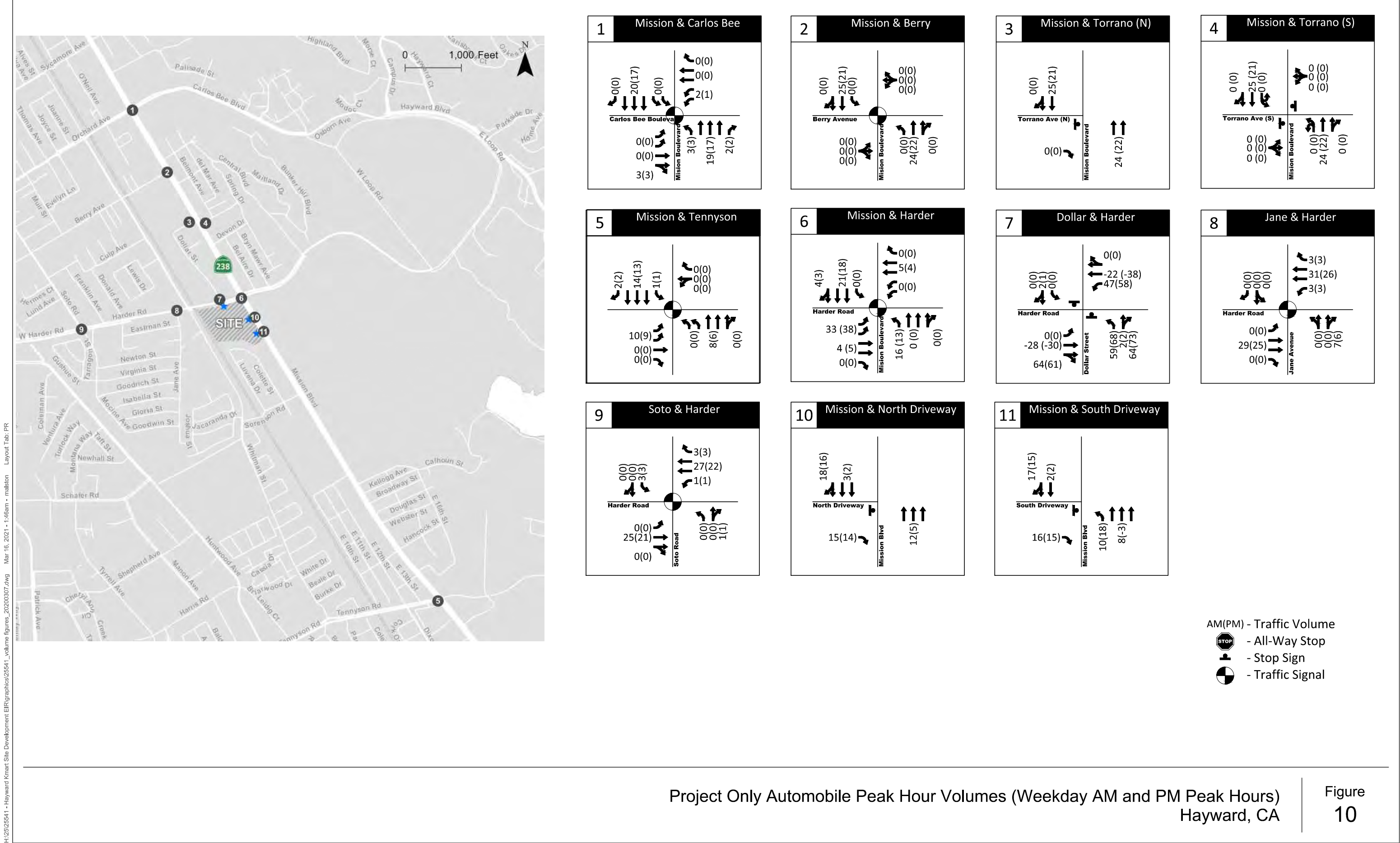


Figure
9



4 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This chapter discusses the results of the Existing Plus Project analysis, which was conducted for non-CEQA local transportation analysis purposes. The analysis is intended to represent typical conditions, which can be expected to differ from initial opening conditions. Within the first weeks or months of project occupancy, project-related travel may either be lower than conditions described in this analysis (if the site is only partially occupied initially) or higher (if there is a “breaking in” period associated with newly available retail opportunities). Either circumstance would be expected to converge to a typical operation condition, as described in this section.

4.1 EXISTING PLUS PROJECT AUTOMOBILE LEVEL OF SERVICE

The automobile turning movement counts for the Existing Plus Project scenario were developed from the sum of the Existing Conditions turning movement counts and the project-only turning movements described above (and displayed in Figure 10). Figure 11 presents the Existing Plus Project turning movements.

Table 17 presents the Existing Conditions and Existing Plus Project delays and LOS for the study intersections. The table also compares the change in delay between the two scenarios. Appendix 4 contains the Existing Plus Project LOS worksheets. Intersection delay slightly decreases at one signalized intersection with the addition of project trips because an addition of trips to a movement with relatively low delay actually decreases the average intersection delay overall.

Table 17: Automobile Level of Service, Existing Plus Project Conditions

#	Intersection	Control	Peak Hour	Existing		Existing Plus Project		Delay Delta (s/veh)
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	Signal	AM	44.5	D	44.7	D	0.2
			PM	42.6	D	42.8	D	0.2
2	Mission Boulevard & Berry Avenue	Signal	AM	15.2	B	15.4	B	0.2
			PM	8	A	8	A	0
3	Mission Boulevard & Torrano Avenue (North)	TWSC	AM	21.8	C	22.1	C	0.3
			PM	17.2	C	17	C	-0.2
4	Mission Boulevard & Torrano Avenue (South)	TWSC	AM	>50	F	>50	F	>5
			PM	>50	F	>50	F	5
5	Mission Boulevard & Tennyson Road	Signal	AM	36.2	D	36.3	D	0.1
			PM	53.9	D	53.8	D	-0.1
6	Mission Boulevard & Harder Road	Signal	AM	65.6	E	68	E	2.4
			PM	56	E	56.5	E	0.5
7	Harder Road & Dollar Street	TWSC	AM	>50	F	>50	F	>5
			PM	>50	F	>50	F	>5
8	Harder Road & Jane Avenue	Signal	AM	23.4	C	25.4	C	2
			PM	30.3	C	30	C	-0.3
9	Harder Road & Soto Road	Signal	AM	>80	F	>80	F	<5
			PM	44.6	D	45.1	D	0.5
10	Mission Boulevard & North Driveway	TWSC	AM	-	-	32.8	D	-
			PM	-	-	20.4	C	-
11	Mission Boulevard & South Driveway	TWSC	AM	-	-	28.5	D	-
			PM	-	-	18.2	C	-

Bold indicates intersection operating below LOS standard. **Shading** indicates intersection improvement required.

Source: Kittelson & Associates, Inc. 2021.

As shown in Table 17, the following intersections either degrade to below LOS standard with the addition of project trips or, if already operating below the LOS standard, incur at least 5 seconds of additional average control delay with the addition of project trips:

- **#4 Mission Boulevard & Torrano Avenue (South):** This intersection continues to operate below the LOS standard, with an LOS F and more than 5 seconds of additional average control delay with the addition of project trips in the weekday AM and PM peak hours.² However, the intersection does not meet the peak hour signal warrant under Existing Plus Project conditions (see Table 18 and Appendix 4). Therefore, potential improvements other than a traffic signal are discussed below.

² The full LOS worksheets and reports are provided in Appendix 4. The static outputs show an increase in AM peak hour delay with the addition of project trips. Due to the level of intersection oversaturation, the results do not show an increase with the addition of project trips in the PM peak hour. The volume input parameters appear to be outside the bounds of Synchro's implementation of Highway Capacity Manual methodologies. However, because additional delay in relation to traffic volumes is exponential in nature, it was judged that the addition of project trips would likely add more than five seconds of additional delay to the worst movement at the project intersection.

An option explored in both the AM and PM peak hours was to restripe the westbound and eastbound approaches to separate left-turn movements from right and through movements. In both cases, this solution reduced the side-street average control delays to pre-project levels. However, the eastbound approach to the intersection is a commercial parking driveway without sufficient room for such restriping. The intersection would still operate below the City's LOS standard, and the peak hour signal warrants would not be met in either the AM or PM peak hour. Because the side-street volumes are relatively low and there may be other considerations at this intersection (i.e., safety considerations and design vehicle movements related to lane widths), no modifications are recommended at this location.

- **#7 Harder Road & Dollar Street:** This intersection continues to operate below the LOS standard, with an LOS F and more than 5 seconds of additional average control delay with the addition of project trips in the weekday AM and PM peak hours. The intersection meets the peak hour signal warrant under Existing and Existing Plus Project conditions (see Table 18 and Appendix 4). Therefore, intersection improvements should be identified.

It is recommended that a traffic signal be installed at this location. With signalization, the intersection would operate within the standard. Modeled with a traffic signal and a protected/permissive northbound left-turn phase, the intersection operates within City LOS standards in the weekday PM peak hour.³ Since the project results in operational deficiencies under the Existing Plus Project scenario and this intersection serves as a primary access driveway for the Project, the project's fair share contribution toward improvements is 100%.

Two other options were preliminarily considered at this location. One was a roundabout, which generally provides safety benefits and provides capacity benefits relative to all-way stop controls and comparable with some traffic signals. *NCHRP Report 672: Roundabouts – An Informational Guide* (NCHRP Report 672) provides planning-level information regarding roundabout lane and size requirements. Exhibit 6-9 in NCHRP Report 642 provides typical inscribed circle diameter ranges for roundabouts depending on the intersection design vehicle. Given that Harder Road is a local truck route and would be expected to serve WB-50 or WB-67 vehicles, Exhibit 6-9 indicates that a single-lane inscribed circle diameter range could be expected to be between 130 to 180 feet just to the edge of the vehicle traveled way.⁴ Irrespective of approach treatments to achieve proper speed control and considering proximity to the Mission Boulevard & Harder Road

³ See supplementary memorandum included in Appendix 8 for more details.

⁴ Hayward Truck Route information obtained from <https://www.hayward-ca.gov/police-department/truck-routes-and-transportation-permits>

intersection, the expected right-of-way requirements of a roundabout at this location make it an infeasible improvement option.

The other option analyzed at this location was prohibition of turning movements: prohibiting left-turn and through movements from the project site and from Dollar Street into the project would reduce the delay at the intersection and reduce the potential for vehicle conflicts. However, prohibiting those movements would limit accessibility to and from the site and increase circuitry on the transportation network. For example, outbound project visitors with destinations west or north of the project site would need to travel out-of-direction and find U-turn opportunities, straining the roadway network. As a result, the signal option was recommended for more detailed assessment.

- o Signalization of this intersection would provide other benefits. As noted in Section 1.2.3, pedestrian crossing opportunities along Harder Road are limited to signalized intersections and one improved crossing at Franklin Avenue. Signalization of this intersection would provide an additional controlled pedestrian crossing of Harder Road (current crossing opportunities at Mission Boulevard and at Jane Street are approximately 1,100 feet apart) and would improve pedestrian access to and from the project site. A signal would also provide dedicated phases for controlled access into and out of the project site, including northbound drivers and westbound left-turning drivers who would otherwise need to identify gaps in traffic. Further analysis was conducted to assess the feasibility and refine the details of the intersection and signal design, given the proximity to Mission Boulevard and the possibility of queueing propagating from one intersection to another. The analysis determined that a signal is feasible. The analysis memo includes a recommendation to connect the Harder/Dollar signal controller to the existing SCATS coordinated system at Mission/Harder. Per City staff advisement, coordination would also require connecting the controller at Harder Road & Jane Avenue to the system. This connection along Harder Road from Mission Boulevard to Jane Avenue would create a larger coordinated system that would adjust signal cycles dynamically to maintain smooth traffic flow through the new traffic signal at Harder Road/Dollar Street while allowing phasing to be responsive to future traffic demands.
- o Recommendations are discussed in more detail in the memorandum included in Appendix 8 and are summarized in Section 9 of this report.

LOS and queue report worksheets for the signalized improvement are included in Appendix 4.

Table 18: Traffic Signal Peak Hour Warrants, Existing Plus Project Conditions

#	Intersection	Traffic Control	Peak Hour	Warrant Met?
4	Mission Boulevard & Torrano Avenue (South)	TWSC	AM	No
			PM	No

7	Harder Road & Dollar Street	TWSC	AM	Yes
			PM	Yes

Based on California MUTCD (2020) Peak Hour Warrant.

Source: Kittelson & Associates, Inc. 2021.

4.2 EXISTING PLUS PROJECT QUEUE STORAGE

Table 19 presents 95th percentile vehicle queues in excess of available storage in Existing Plus Project Conditions. Appendix 4 contains Synchro queue reports, and Appendix 3 contains an intersection queue spreadsheet for all study intersections.

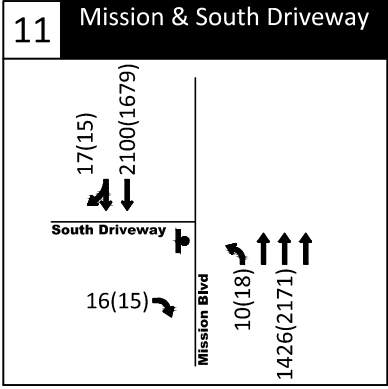
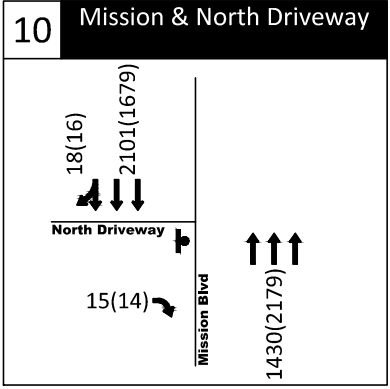
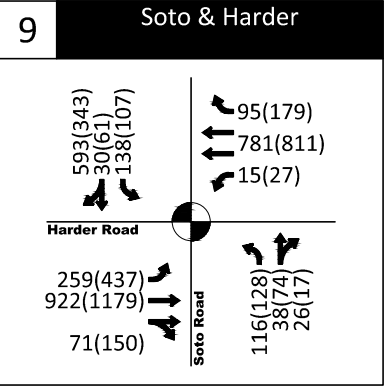
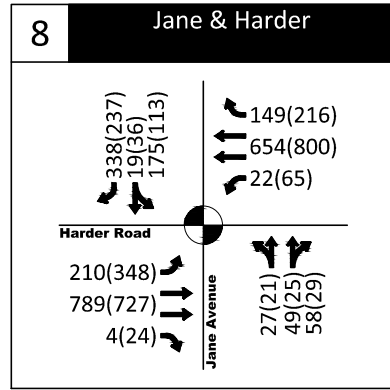
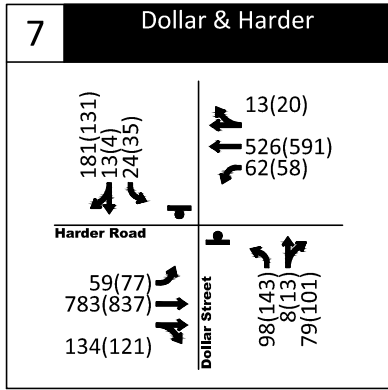
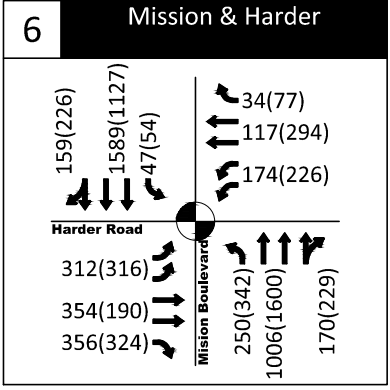
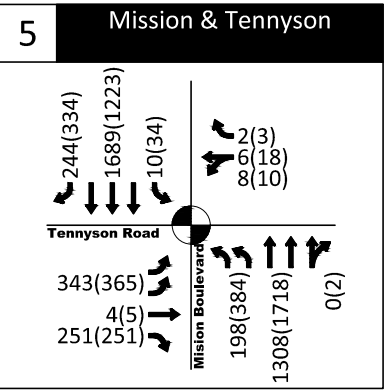
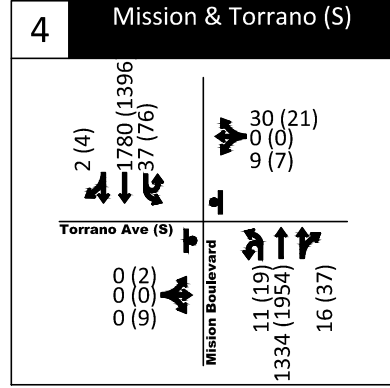
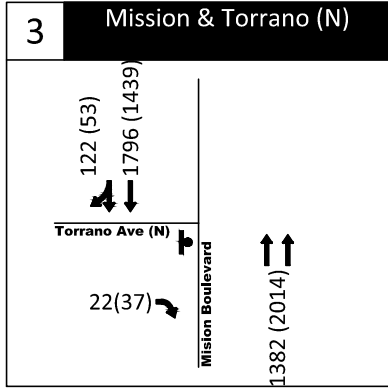
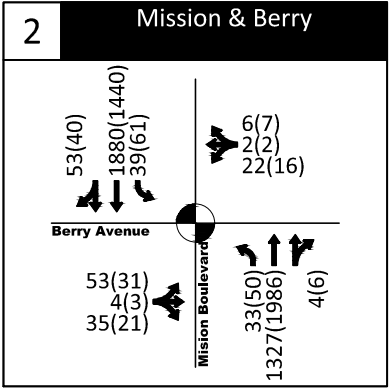
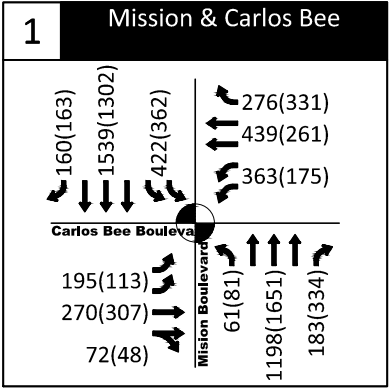
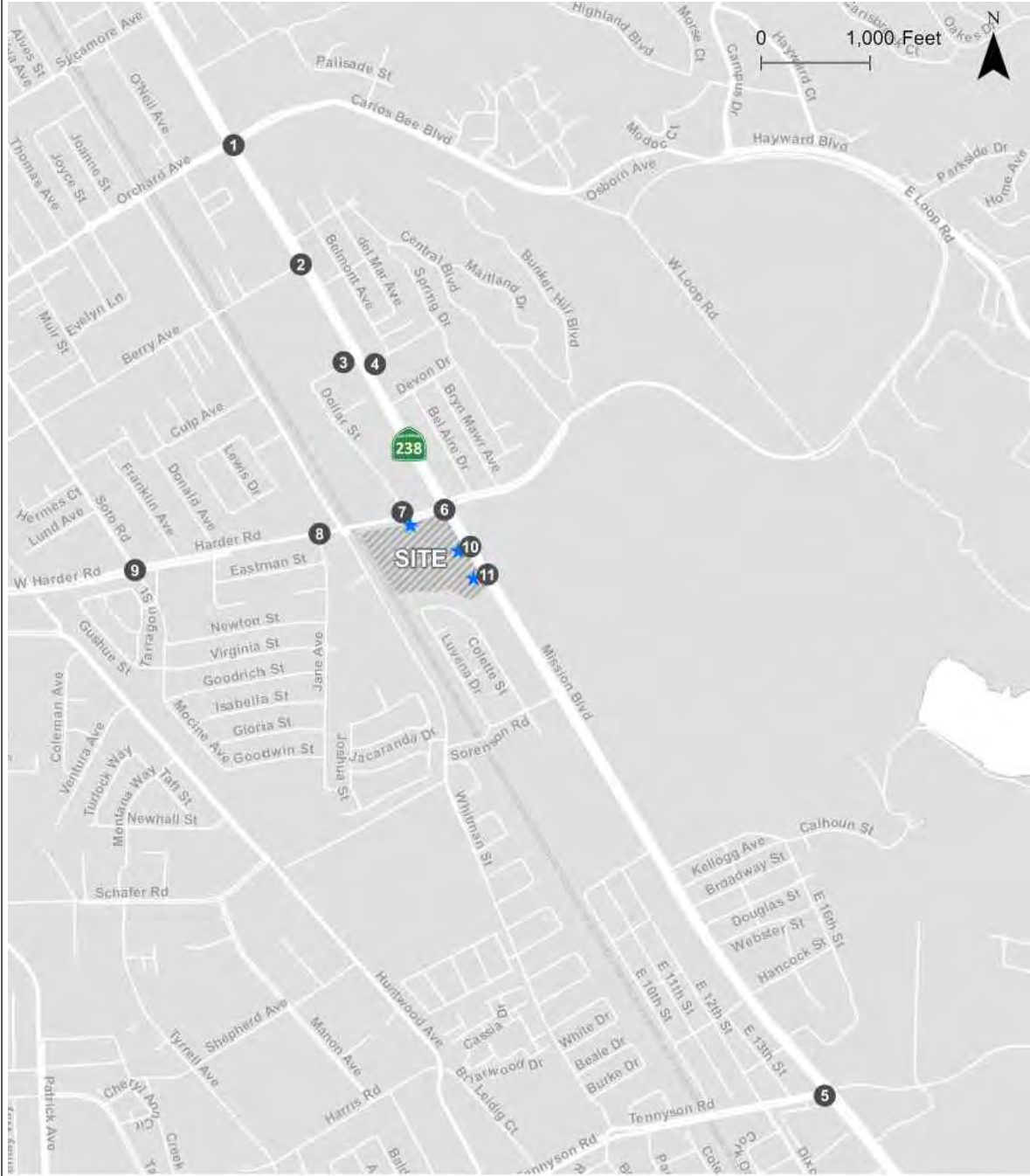
Table 19: Queue Lengths in Excess of Capacity, Existing Plus Project Conditions

#	Intersection / Movement		Peak Hour	Did Queue Exceed Storage in No Project Condition? (Yes/No)	Spills to Adjacent Intersection?	Increase in Queue with Addition of Project Trips
1	Mission Boulevard & Carlos Bee Boulevard	WBL	AM	Yes	No	1 foot (less than 1 car length)
2	Mission Boulevard & Berry Avenue	NBT/R	PM	Yes	No	12 feet (less than 1 car length)
6	Mission Boulevard & Harder Road	EBL	AM & PM	Yes	No	AM: 20 feet (1 car length) PM: 21 feet (1 car length)
7	Harder Road & Dollar Street	NBL	AM & PM	No	Yes	AM: 233 feet (9 car lengths) PM: 248 feet (10 car lengths)
8	Harder Road & Jane Avenue	EBL	AM & PM	Yes	No	AM: 0 feet PM: 0 feet
9	Harder Road & Soto Road	NBL	AM & PM	Yes	No	0 feet
		EBL	PM	Yes	No	0 feet
		WBT	AM & PM	Yes	Yes	AM: 25 feet (1 car length) PM: 19 feet (1 car length)

Source: Kittelson & Associates, 2021.

As shown in Table 19, the addition of project trips is not expected to contribute more than one car length to existing queues at study intersections that extend beyond available capacity, with the exception of the northbound approach at Harder Road & Dollar Street. Because that intersection serves as a primary driveway access for the project site, northbound intersection approach queues would be accommodated on the project site rather than in the public right-of-way.

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- AM(PM) - Traffic Volume
- All-Way Stop
 - Stop Sign
 - Traffic Signal

Existing Plus Project Turning Movement Forecasts (Weekday AM and PM Peak Hours)
Hayward, CA

Figure
11

5 CUMULATIVE 2040 PLUS PROJECT CONDITIONS

The potential operational deficiencies to the transportation system were evaluated under the Cumulative Year 2040 Condition for non-CEQA local transportation analysis purposes. Intersection operations were evaluated using projected peak hour traffic volumes derived from the Hayward General Plan Update version of the Alameda CTC Countywide Model.

5.1 DEVELOPMENT OF CUMULATIVE 2040 DEMAND

The model includes future development throughout the region. The 2035 forecasts are consistent with regional totals for growth projected by ABAG in their Projections 2009 report. Cumulative No-Project volumes were extracted from the travel model and adjusted based on the incremental or difference method described in NCHRP 255⁵ methods, consistent with the methodology used for the Hayward General Plan and other citywide Specific Plans. The method compares future year model volumes to existing year model volumes to identify the growth increment, and then adds this increment to the existing counts, thus smoothing out any model validation error compared to existing counts. When new roadway facilities are introduced, in some cases traffic growth would be allowed to reduce below existing count levels for some turn movements. In this case, there are no significant new roadway facilities in the immediate study area, so the incremental adjustment method did not produce negative traffic growth. To be consistent with the ABAG growth projections at 2040 levels and to align with the timing of the Hayward General Plan buildout, Kittelson extrapolated the 2035 turning movement volumes to 2040 by projecting the same growth out for five additional years.

Therefore, the traffic forecasts reflect traffic from growth in Hayward as well as traffic from future developments in the region that may use the local roadways.

The automobile turning movement counts for the Cumulative 2040 scenario are displayed in Figure 12.

⁵ Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1992.

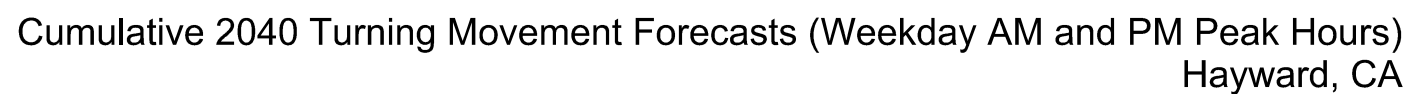


Figure
12



Figure
13

5.2 CUMULATIVE 2040 PLUS PROJECT AUTOMOBILE LEVEL OF SERVICE

Cumulative Plus Project scenario were developed from the sum of the Cumulative 2040 No Project volumes and the project-only turning movements. The Cumulative 2040 No Project volumes are presented in Figure 12. Project-only volume development is described in Section 3, and the volumes are shown in Figure 10. Cumulative 2040 Plus Project volumes are shown in Figure 13.

Table 20 presents the Cumulative 2040 and Cumulative 2040 Plus Project delays and LOS for the study intersections. The table also compares the change in delay between the two scenarios. Appendix 5 and Appendix 6 contain the LOS worksheets, queueing reports, and peak hour signal warrant analyses for these scenarios.

Table 20: Automobile Level of Service, Cumulative 2040 No Project and Plus Project Conditions

#	Intersection	Control	Peak Hour	Cumulative		Cumulative Plus Project		Delay Delta (s/veh)
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	Signal	AM	>80	F	>80	F	<5
			PM	>80	F	>80	F	<5
2	Mission Boulevard & Berry Avenue	Signal	AM	102	F	104.9	F	2.9
			PM	12.1	B	12.4	B	0.3
3	Mission Boulevard & Torrano Avenue (North)	TWSC	AM	>50	F	>50	F	<5
			PM	21.6	C	21.3	C	-0.3
4	Mission Boulevard & Torrano Avenue (South)	TWSC	AM	>50	F	>50	F	>5
			PM	>50	F	>50	F	>5
5	Mission Boulevard & Tennyson Road	Signal	AM	>80	F	>80	F	<5
			PM	>80	F	>80	F	<5
6	Mission Boulevard & Harder Road	Signal	AM	>50	F	>50	F	>5
			PM	>50	F	>50	F	<5
7	Harder Road & Dollar Street	TWSC	AM	>50	F	>50	F	>5
			PM	>50	F	>50	F	>5
8	Harder Road & Jane Avenue	Signal	AM	25	C	27.7	C	2.7
			PM	42.5	D	42.8	D	0.3
9	Harder Road & Soto Road	Signal	AM	>80	F	>80	F	<5
			PM	60.5	E	24.3	E	3.8
10	Mission Boulevard & North Driveway	TWSC	AM	0	A	>50	F	>5
			PM	0	A	25.9	D	25.9
11	Mission Boulevard & South Driveway	TWSC	AM	0	A	>50	F	>5
			PM	0	A	22.8	C	22.8

Source: Kittelson & Associates, Inc. 2020

Bold indicates intersection operating below LOS standard. **Shading** indicates intersection improvement required.

As shown in Table 20, the following intersection is already operating below the LOS standard and incurs at least 5 seconds of additional average control delay with the addition of project trips:

- **#4 Mission Boulevard & Torrano Avenue (South):** This intersection continues to operate below the LOS standard, with an LOS F and more than 5 seconds of additional average control delay with the addition of project trips in the weekday AM and PM peak hours.⁶ However, the intersection does not meet the peak hour signal warrant under Cumulative Plus Project conditions (see Table 21 and Appendix 5). Therefore, potential improvements other than a traffic signal are discussed below.

An option explored in both the AM and PM peak hours was to restripe the westbound and eastbound approaches to separate left-turn movements from right and through movements. In both cases, the delay is not shown to decrease appreciably with the restriping. Another option would be to prohibit left turns and through movements from the side-street approaches, requiring drivers to make a right turn and continue along Mission Boulevard to make a U-turn when available. This change would reduce LOS levels to within the City's standards. However, the restriction may have other network and circuitry effects that should be analyzed separately before such a change is recommended. No modifications are recommended at this intersection.

#6: Mission Boulevard & Harder Road: This intersection continues to operate below the LOS standard, with an LOS F and more than 5 seconds of additional average control delay with the addition of project trips in the weekday AM peak hour. Therefore, intersection improvements should be identified.

The following intersection adjustments would reduce intersection delay to lower than Cumulative No Project levels:

- Run eastbound right Harder Road right-turn movements in an overlap phase with the corresponding protected left-turn and northbound through phases on Mission Boulevard. These changes would reduce overall average intersection delay to 151.3 seconds in the weekday AM peak hour (compared to Cumulative No Project average delay of 160.8 seconds). However, this adjustment would require prohibition of northbound and southbound U-turn movements which provides a network benefit that the City may prefer to retain.
- Restripe the outer through lane on the eastbound approach to provide a shared through/right-turn lane. This change would reduce overall average intersection delay to 148.0 seconds in the weekday AM peak hour. However, double turn lanes degrade the quality of

⁶ The full LOS worksheets and reports are provided in Appendix 4. The static outputs show an increase in AM peak hour delay with the addition of project trips. Due to the level of intersection oversaturation, the results do not show an increase with the addition of project trips in the PM peak hour. The volume input parameters appear to be outside the bounds of Synchro's implementation of Highway Capacity Manual methodologies. However, because additional delay in relation to traffic volumes is exponential in nature, it was judged that the addition of project trips would likely add more than five seconds of additional delay to the worst movement at the project intersection.

service and safety of pedestrians and bicyclists and may be undesirable to implement. Additionally, the existing Class II bicycle lane on Harder Road would need to be redesigned at the intersection approach to accommodate this change.

No intersection modifications are recommended at this location. The conditions described with this operational effect would not be realized until at least 2035 and can be reevaluated at that time based on actual counts rather than projected volumes.

- **#7 Harder Road & Dollar Street:** This intersection continues to operate below the LOS standard, with an LOS F and more than 5 seconds of additional average control delay with the addition of project trips in the weekday AM and PM peak hours. The intersection meets the peak hour signal warrant under Cumulative and Cumulative Plus Project conditions (see Table 21, Appendix 5, and Appendix 6). Therefore, intersection improvements should be identified.

It is recommended that a traffic signal be installed at this location. With signalization, the intersection would operate within the standard. Modeled with a traffic signal and a protected/permissive northbound left-turn phase, the intersection has an LOS B and is within City LOS standards in the weekday AM and PM peak hours. Since this operational deficiency and necessary improvement are also present under the Existing Plus Project scenario and this intersection serves as a primary access driveway for the Project, the project's fair share contribution to improvements is 100%.

Two other options were preliminarily considered at this location. One was a roundabout, which was considered infeasible as explained in Section 4.1. In addition, the Cumulative Plus Project intersection volumes would likely require a multilane roundabout, for which right-of-way needs would be more significant.

- **#11 Mission Boulevard & South Driveway:** Outbound drivers leaving the project driveway (i.e., eastbound right-turning drivers) experience an average of greater than 50 seconds of delay in the AM peak hour. However, outbound vehicles would queue onto the project site rather than into the public right-of-way. Queueing analysis indicates that the 95th percentile queue for the eastbound movement at this site is less than one car length (approximately 3 feet).

Table 21: Traffic Signal Peak Hour Warrants, Cumulative Plus Project Conditions

#	Intersection	Traffic Control	Peak Hour	Warrant Met?
4	Mission Boulevard & Torrano Avenue (South)	TWSC	AM	No
			PM	No
7	Harder Road & Dollar Street	TWSC	AM	Yes
			PM	Yes

Based on California MUTCD (2020) Peak Hour Warrant.
Source: Kittelson & Associates, Inc. 2020.

5.3 CUMULATIVE 2040 PLUS PROJECT QUEUE STORAGE

Table 22 presents 95th percentile vehicle queues in excess of available storage in Cumulative 2040 Plus Project Conditions. Appendix 5 and Appendix 6 contain Synchro queue reports, and Appendix 3 contains an intersection queue spreadsheet for all study intersections.

Table 22: Queue Lengths in Excess of Capacity, Cumulative 2040 Plus Project Conditions

#	Intersection	Movement	Peak Hour	Did Queue Exceed Storage in No Project Condition?	Spills to Adjacent Intersection?	Increase in Queue with Addition of Project Trips
1	Mission Boulevard & Carlos Bee Boulevard	NBL	AM	Yes	No	7 feet (less than 1 car length)
		SBL	AM & PM	Yes	No	AM: 0 feet PM: 0 feet
		SBR	AM & PM	Yes	No	AM: 4 feet (less than 1 car length) PM: 11 feet (less than 1 car length)
		EBL	AM & PM	Yes	No	AM: 0 feet PM: 3 feet (less than 1 car length)
		EBT/R	PM	Yes	Yes	3 feet (less than 1 car length)
		WBL	AM	Yes	No	4 feet (less than 1 car length)
		WBR	PM	Yes	No	1 foot (less than 1 car length)
2	Mission Boulevard & Berry Avenue	NBT/R	PM	Yes	Yes	12 feet (1 car length)
		SBT/R	AM	Yes	Yes	27 feet (1 car length)
5	Mission Boulevard & Tennyson Road	NBL	PM	Yes	No	0 feet
		SBL	PM	Yes	No	0 feet
		SBT	AM	Yes	Yes	11 feet (less than 1 car length)
		SBR	AM & PM	Yes	No	AM: 7 feet (less than 1 car length) PM: 16 feet (less than 1 car length)
		EBL	PM	Yes	No	11 feet (less than 1 car length)
		EBR	AM	Yes	No	5 feet (less than 1 car length)
6	Mission Boulevard &	NBL	AM & PM	Yes	No	AM: 29 feet (2 car lengths) PM: 31 feet (1 car length)

#	Intersection	Movement	Peak Hour	Did Queue Exceed Storage in No Project Condition?	Spills to Adjacent Intersection?	Increase in Queue with Addition of Project Trips
	Harder Road	SBT/R	AM	Yes	Yes	19 feet (1 car length)
		EBL	AM & PM	Yes	No (AM) Yes (PM)	AM: 22 feet (1 car length) PM: 47 feet (2 car lengths)
		EBT	PM	Yes	Yes	3 feet (less than 1 car length)
		EBR	AM & PM	Yes	Yes	AM: 3 feet (less than 1 car length) PM: 2 feet (less than 1 car length)
7	Harder Road & Dollar Street	NBL	AM & PM	Yes	N/A	AM: 237 feet (8 car lengths) PM: >140 feet (>6 car lengths)
		NBT/R	PM	Yes	N/A	210 feet (8 car lengths)
		SBL	AM & PM	Yes	Yes	>70 feet(>3 car lengths)
		SBT/R	AM & PM	No	Yes	AM: 70 feet (3 car lengths) PM: 238 feet (10 car lengths)
8	Harder Road & Jane Avenue	SBL/T	AM & PM	Yes	Yes	0 feet
		EBL	AM & PM	Yes	No	AM: 5 feet (less than 1 car length) PM: 0 feet
		WBL	PM	No	No	3 feet (less than one car length)
9	Harder Road & Soto Road	NBL	AM & PM	Yes	No	0 feet
		SBL	AM & PM	AM: No PM: Yes	No	AM: 4 feet (less than one car length) PM: 3 feet (less than one car length)
		EBL	PM	Yes	No	2 feet (less than one car length)
		WBT	AM & PM	Yes	Yes	AM: 25 feet (one car length) PM: 0 feet

Source: Kittelson & Associates, 2021.

As shown in Table 22, the addition of project trips is not expected to contribute more than two car lengths to existing queues at study intersections, with the exception of the northbound approach at Harder Road & Dollar Street, the southbound approach to Harder Road & Dollar Street (3 car length addition), and the northbound and eastbound left turns at Mission Boulevard & Harder Road (2 car length addition). Because that intersection serves as a primary access driveway for the project site, northbound intersection approach queues would be accommodated on the project site rather than in the public right-of-way.

6 PUBLIC TRANSIT, PEDESTRIAN, AND BICYCLE ASSESSMENT

This section discusses potential effects on public transit, pedestrians, and bicyclists. To supplement this analysis, the Alameda County Transportation Commission (ACTC) Development Review Complete Streets Checklist was completed and is included as Appendix 7.

6.1 TRANSIT ASSESSMENT

Section 4 presented Existing Plus Project conditions and identified Harder Road & Dollar Street to operate below the LOS standard and meets the peak hour signal warrant in Existing Plus Project conditions. This intersection does not serve any AC Transit lines. No other intersections require improvement in the Existing Plus Project scenario.

Section 5 presented the Cumulative Plus Project conditions. That section also identified and identified Harder Road & Dollar Street to operate below the LOS standard and to meet the peak hour signal warrant. The analysis identified one location serving AC Transit lines along Mission Boulevard that does require improvement: Mission Boulevard & Harder Road (#6). Recommended improvements have been provided for both locations but are not feasible.

The project is not expected to degrade local access to bus stops along Mission Boulevard, which can be accessed via the local sidewalk network and existing facilities such as ADA curb ramps and continental crosswalks along Mission Boulevard. Therefore, implementation of the project would not conflict with plans, programs, and policies regarding transit facilities or decrease the performance and safety of such facilities.

6.2 PEDESTRIAN ASSESSMENT

As noted in Section 1.2.3, the study area features sidewalks, crosswalks, and curb ramps that are in good condition. Marked crosswalks (including continental crosswalks) and curb ramps with tactile warning devices are generally provided at arterial intersections. Residential street intersections tend to have unmarked crossings with ADA ramps.

As the project site plan shows (see Figure 8 on page 34), the project provides sidewalks and crossings for interior pedestrian access to the larger building or two the two smaller buildings from either access point. Pedestrians in the study area may also be affected due to an increase in vehicular trips to and from the site. Pedestrians traveling along Harder Road or Mission Boulevard may experience increased conflicts with vehicles entering or exiting the project site. Pedestrians will access the project site via either Harder Road access or the northern access driveway along Mission Boulevard.

Potential treatments at the project driveways can reduce the presence of these conflicts or reduce should be considered to increase pedestrian safety, as part of design review and conditions of approval. Treatments could include:

- Provide clear sight triangles at project driveways (i.e., free of landscaping and signage) and continue to disallow parking on the south side of Harder Road and the west side of Mission Street.
- Provide high-visibility (continental) striped crosswalks along the project driveways.
- Coordinate with the City of Hayward to install warning signage at the project driveways.

As described in Section 4.1, a traffic signal is recommended at the Harder/Dollar intersection (also the northern project driveway). Appendix D of the 2020 BPMP provides design guidelines for promoting pedestrian safety and access at traffic signals. The project should coordinate with the City to incorporate relevant design recommendations into the signal design, which includes:

- Include at least a four-second leading pedestrian interval (LPI) in the signal timing for all four pedestrian phases, which would give pedestrians a head start crossing the intersection and improve their visibility to right-turning motorists.
- Install high-visibility continental or ladder-style crosswalks and provide pedestrian signal phases across the three newly-marked crosswalks (across the east, west, and south legs). The signal should include pushbutton actuation for pedestrians and an accessible pedestrian signal (APS).

As noted in Section 1.2.3, the 2020 BPMP identified the full extent of Harder Road as a prioritized improvement corridor. The improvements above would address the project's frontage along the corridor.

The project would also add vehicle trips at Harder Road & Jane Road (#8), which is along the BPMP prioritized improvement corridor. The project should coordinate with the City to restripe existing crosswalks at this intersection as high-visibility (continental) crosswalks, consistent with recommended strategies identified in the BPMP.

6.3 BICYCLE ASSESSMENT

The project site plan (Figure 8 on page 34) includes an enclosure for dedicated bicycle parking. California Green Building Code (CALGreen) requirements for developers recommend providing bicycle parking for 5% of the vehicular parking spaces added on a site. The project site plan (Figure 8) proposes to provide 467 vehicle parking stalls, so 5% of vehicular parking would be a minimum of 24 bike parking stalls.

People accessing the site by bicycle would be able to access the site via Class II bicycle lanes on Harder Road. To enter the site along Harder Road traveling westbound, people biking would need to

merge across two through vehicle lanes into a left-turn pocket. As described in Section 4.1, a traffic signal is recommended at the Harder/Dollar intersection (also the northern project driveway). The eventual design of the traffic signal (see Sections 4.1 and 5.2) should include provision for left-turning bicyclists, which are described Appendix D of the 2020 BPMP and below.

There are no existing bicycle facilities along Mission Boulevard. The site design does not degrade bicycle accessibility, but the Harder Road & Dollar Street access is more amenable to people biking than the Mission Boulevard driveways given the bicycle facilities.

As discussed in Section 1.2.4, the City's BPMP includes recommendations for the following bicycle facilities, both of which front the project site:

- Class IV separated bike lanes on Mission Boulevard throughout the study area
- Class IV separated bike lanes on Harder Road throughout the study area

The project should coordinate with the City to provide funding for future Class IV separated bike lanes along Harder Road and Mission Boulevard along the project frontages or in-lieu funding for similar bicycle improvements in the project vicinity. The project should coordinate with the City to identify opportunities for interim bicycle facility striping along Harder Road between Jane Avenue and Dollar Street (the project site).

Additionally, recommended traffic signal should include the following design elements to promote bicycle access, comfort, and safety:

- Install KEEP CLEAR pavement markings in the Harder/Dollar intersection.
- Stripe two-stage turn queue boxes for both eastbound and westbound left turns for people biking. Pages 25-26 of Appendix D of the Hayward Bicycle and Pedestrian Master Plan (BPMP) include details and guidance for designing and installing the treatment.
- Install an advanced stop bar ("bike box") on the eastbound approach to Harder/Dollar for people biking to position themselves in front of drivers turning right at Dollar Street or at Mission Boulevard. Details and design guidance are provided on pages 23-24 of Appendix D to the BPMP.
- Provide green "crossbike" markings to continue the bicycle lane and clearly delineate space for people biking through the intersection along Harder Road eastbound and westbound. Pages 27-28 of Appendix D to the BPMP include details and design guidance.

These recommendations are discussed in more detail in the memorandum attached in Appendix 8 which analyzes signal feasibility. Recommendations at this location include:

7 PARKING ANALYSIS

This section compares project parking provision to City requirements and provides a qualitative analysis of street parking in the study area. The project is subject to the parking requirements within the S-T4 and S-T5 zones within the South Hayward BART Form-Based Code (FBC). The FBC does not have a minimum or maximum parking standards for non-residential uses; thus the proposed project complies with the City's off-street parking standards for parcels within the Code area.

The project site plan includes 467 parking stalls.

The project is immediately surrounded by Mission Boulevard and Harder Road, both of which are arterial roadways that prohibit on-street parking in the immediate project vicinity. Free street parking is available on the west side of Dollar Street north of Harder Road and on the residential streets west of Whitman Street over 1,000 feet from the project site (including Jane Avenue and Eastman Street). On these streets, street parking is typically highly utilized by residents.

8 CIRCULATION AND ACCESS

This section provides an overview of site access and on-site circulation.

8.1 TRUCK AND DELIVERY VAN ACCESS

An analysis of the project driveways and internal site was conducted using AutoCAD AutoTurn to assess circulation and site access for delivery vehicles, emergency vehicles, and garbage trucks. Specifically, AutoTurn templates were prepared for a WB-67 truck. The routes to, through, and from the project site are displayed in Figure 14. Movements that the WB-67 can navigate into and out of the site, and along the site's primary drive aisles and to loading bays behind the retail buildings. The turning analysis also displays the trash collection vehicle path through the site.

The analysis indicates that the WB-67 trucks would over-track into the incoming lane in order to make right-turn movements into and out of the site as shown. Given that all of the driveways are well utilized and serve a relatively high volume of traffic in the AM and PM peak hours, it is recommended that project tenants prioritize WB-67 trucks to schedule making deliveries to the site outside the peak hours (7:00-9:00 AM and 4:00-6:00 PM) when possible. The potential conflict the larger delivery trucks would present during the peak hours would have adverse effects related to site access and circulation into, out of, and within the site.

As demonstrated in Figure 14 and discussed above, trucks and delivery vehicles are able to navigate the site internally (drive aisles and loading docks) as necessary. Since the analysis demonstrates that larger delivery trucks are able to navigate the driveways and drive aisles, it is expected that the smaller garbage trucks and emergency vehicles (standard fire truck) would also be accommodated by the project site.

8.2 PASSENGER VEHICLES

Turn template analysis was not prepared for passenger vehicles, since the delivery truck templates represent the largest vehicles expected to enter and exit the site. Given the results of the truck turning templates, it is expected that the driveway and drive aisles are sufficient to accommodate passenger vehicles.

The drive-through restaurants at Pad A and Pad B provide storage space for 25 and 22 passenger car vehicles, respectively. The drive-through sites are oriented so that queued and inbound traffic would queue onsite and, if they spill back, would spill into the parking lot and drive aisles rather than blocking access to/from Harder Road or Mission Boulevard.

If, upon building occupancy, reoccurring queueing occurs and spills back to obstruct access to and from Harder Road or Mission Boulevard, the City may request the project owner to employ queue management and abatement methods. Suggested methods include:

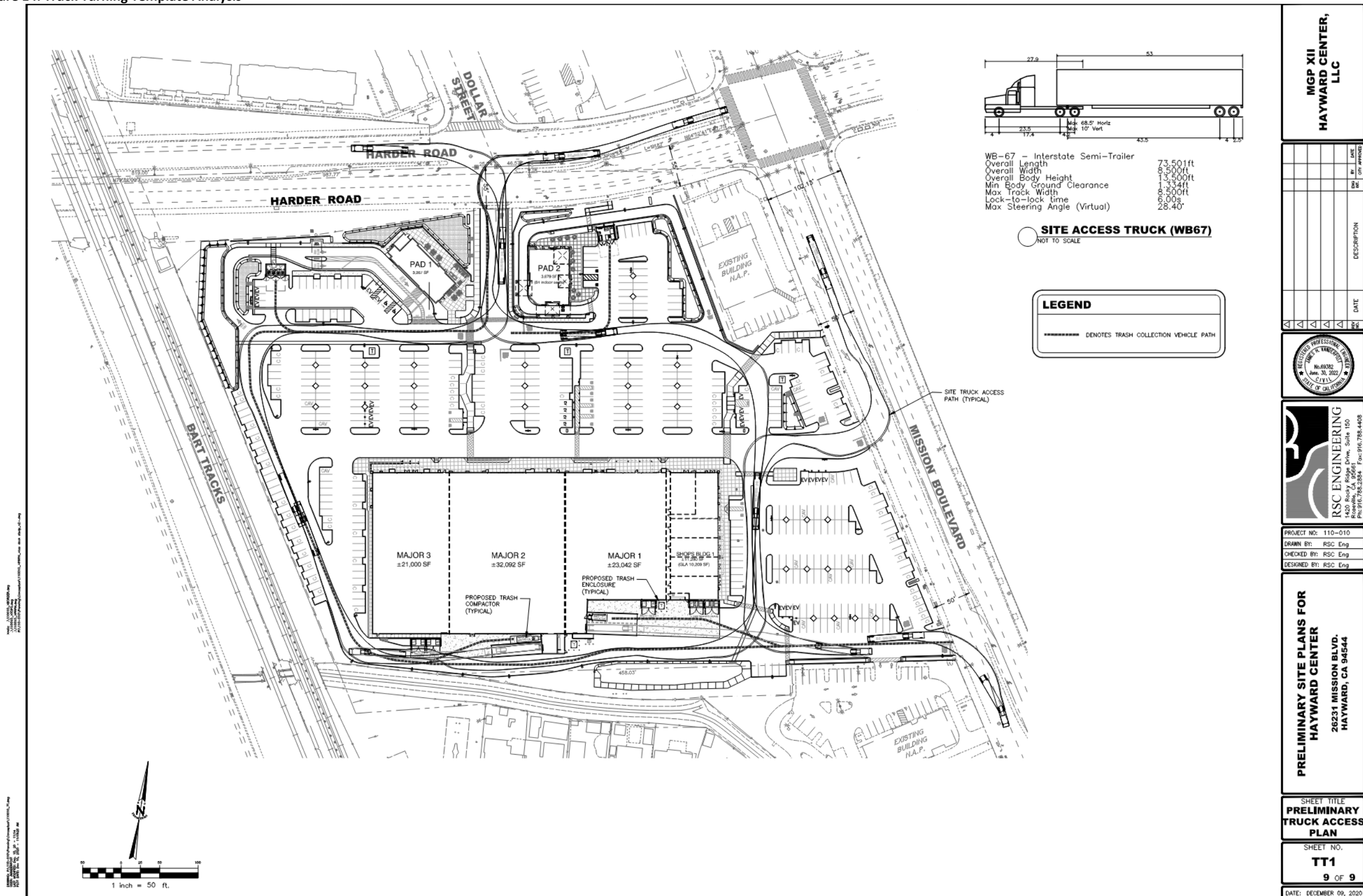
- A lot attendant or other active management of queueing vehicles during peak periods, or
- Redesign of queue storage to improve vehicle circulation and/or queue capacity.

As stated in Section 4, the analysis is intended to represent typical conditions, which can be expected to differ from initial opening conditions. Within the first weeks or months of project occupancy, project-related travel may either be lower than conditions described in this analysis (if the site is only partially occupied initially) or higher (if there is a “breaking in” period associated with newly available retail opportunities). Either circumstance would be expected to converge to a typical operation condition, as described in this section.

8.3 PEDESTRIANS AND BICYCLISTS

Pedestrian and bicyclist access to and from the site was discussed in Sections 6.2 and 6.3, respectively. The project site plan provides sidewalks on the Harder Road access, on the south side of the Mission Boulevard northern driveway access, and on the south side of the Mission Boulevard southern driveway access. The site plan also provides interior circulation via sidewalks, curb ramps, and marked/striped paths within the site. Bicyclists would share the travel paths with people driving once on site. The project site plan includes an enclosure for dedicated bicycle parking on site.

Recommended pedestrian- and bicyclist-oriented improvements for the project driveways and project site are provided in Sections 6.2 and 6.3.



9 SUMMARY OF FINDINGS

The *CEQA Transportation Analysis Report* determined that the project would not be expected to contribute additional VMT and would result in a **less-than-significant** transportation impact under CEQA. No mitigation measures were identified in that report.

The following non-CEQA recommendations have been made in this local transportation assessment, to be incorporated as part of this project:

- Install a traffic signal at Harder Road & Dollar Street. With signalization, the intersection would operate within City level-of-service (LOS) standards. A signal was modeled with a protected/permissive northbound left-turn phase. In Existing Plus Project and Cumulative Plus Project conditions, the signal operates at LOS B and within City standards during the weekday AM and PM peak hour. Since the project results in operational deficiencies under the Existing Plus Project scenario and the intersection serves as a primary access driveway for the project, the project's fair share contribution to improvements is 100%.

Signalization of this intersection would provide an additional controlled pedestrian crossing of Harder Road and would improve pedestrian access to and from the project site. Separate simulation analysis, documented in the memorandum included in Appendix 8, demonstrated that the signal is feasible from an operations standpoint. That memorandum included the following recommendations for the traffic signal:

- Provide a dedicated left-turn lane and a shared right/through lane on the northbound approach at Harder/Dollar. The project proposed site plan can accommodate a 11-foot-wide left-turn lane, an 11-foot-wide through/right turn lane, and a 13-foot, 9-inch-wide southbound receiving lane.
- Connect the Harder/Dollar signal controller to the existing SCATS coordinated system at Mission/Harder. Per City staff advisement, coordination would also require connecting the controller at Harder Road & Jane Avenue to the system. This connection along Harder Road from Mission Boulevard to Jane Avenue would create a larger coordinated system that would adjust signal cycles dynamically to maintain smooth traffic flow through the new traffic signal at Harder Road/Dollar Street while allowing phasing to be responsive to future traffic demands.
- Install KEEP CLEAR pavement markings in the Harder/Dollar intersection.
- Install high-visibility continental or ladder-style crosswalks and provide pedestrian phases across all four legs of the Harder/Dollar intersection. Dollar Street currently has a marked east-west crosswalk on the north leg. The signal should include pushbutton actuation for pedestrians and APS.
- Include at least a four-second LPI in the signal timing for all four pedestrian phases, which would give pedestrians a head start crossing the intersection.
- Stripe two-stage turn queue boxes for both eastbound and westbound left turns for people biking. Pages 25-26 of Appendix D of the Hayward Bicycle and Pedestrian Master Plan (BPMP) include details and guidance for designing and installing the treatment.

- Install an advanced stop bar (“bike box”) on the eastbound approach to Harder/Dollar for people biking to position themselves in front of drivers turning right at Dollar Street or at Mission Boulevard. Details and design guidance are provided on pages 23-24 of Appendix D to the BPMP.
- Provide green “crossbike” markings to continue the bicycle lane and clearly delineate space for people biking through the intersection along Harder Road eastbound and westbound. Pages 27-28 of Appendix D to the BPMP include details and design guidance.
- When designing the horizontal geometry for the intersection, consider pulling back the left-turn stop bar to allow for truck over tracking.

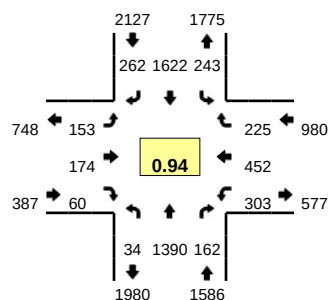
Additional recommendations related to site access include:

- Coordinate with the City to provide treatments at the project driveways to reduce the presence of vehicle-pedestrian conflicts and to increase pedestrian and bicycle safety, as part of design review and conditions of approval. Treatments could include:
 - Providing clear sight triangles at project driveways (i.e., free of landscaping and signage) and continuing to disallow parking on the south side of Harder Road and the west side of Mission Street.
 - Installing green paint to indicate conflict areas at the project driveway and on intersection approaches along Harder Road in the study area.
- The project should coordinate with the City to provide funding for future Class IV separated bike lanes along Harder Road and Mission Boulevard along the project frontages or in-lieu funding for similar bicycle improvements in the project vicinity. As an interim treatment, the project should coordinate with the City to provide a striped bicycle facility along Harder Road between Jane Avenue and Dollar Street.
- The project should coordinate with the City of Hayward to determine the number and location of short-term and long-term bicycle parking spaces to be provided.
- The project sponsor should coordinate with the City to restripe existing marked crosswalks at Harder Road & Jane Road (#8) as high-visibility (continental) crosswalks, given that Harder Road is a prioritized improvement corridor as identified in the BPMP.
- It is recommended that project tenants prioritize larger trucks (i.e., larger than a 30- or 40-foot long single unit truck) make deliveries to the site outside the peak hours (7:00-9:00 AM and 4:00-6:00 PM) when possible to avoid potential conflicts associated with turning movements at project driveways.

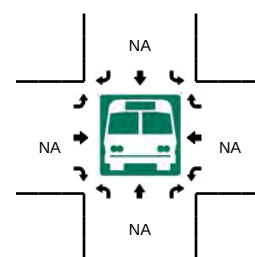
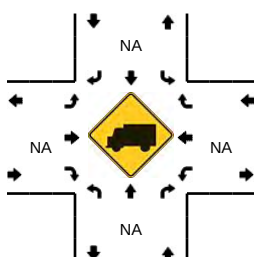
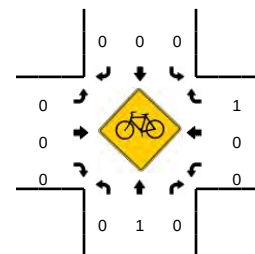
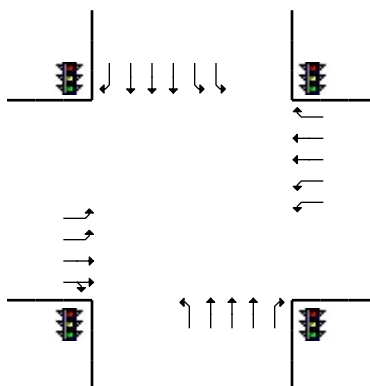
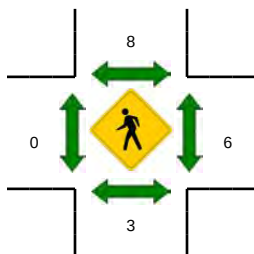
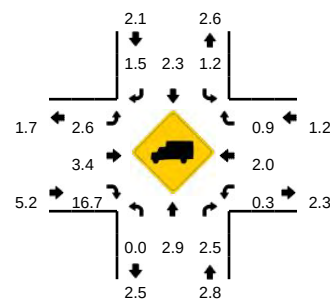
Appendix 1 Traffic Counts and Adjustment Calculations

LOCATION: Mission Blvd -- Orchard Ave
CITY/STATE: Hayward, CA

QC JOB #: 13898107
DATE: Thu, Sep 08 2016



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 8:00 AM -- 8:15 AM

[illegible]

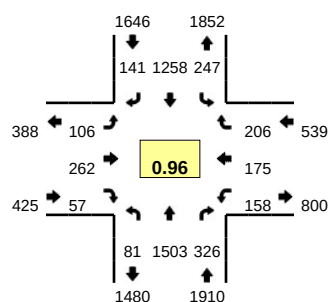
Comments:

Type of peak hour being reported: Intersection Peak

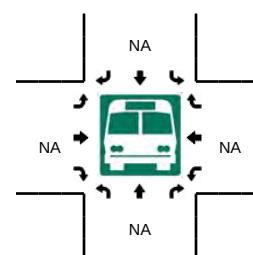
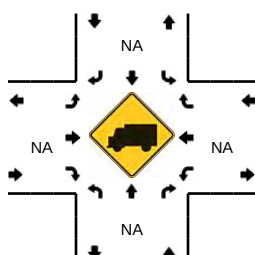
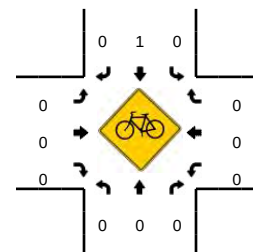
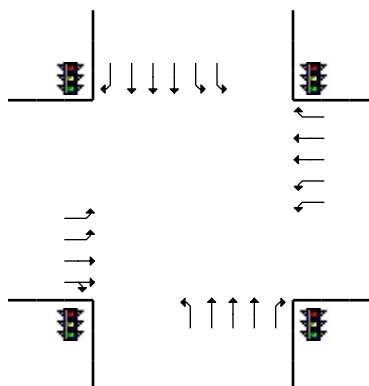
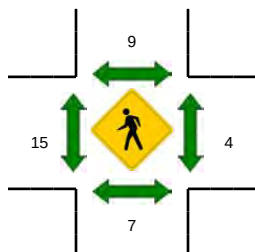
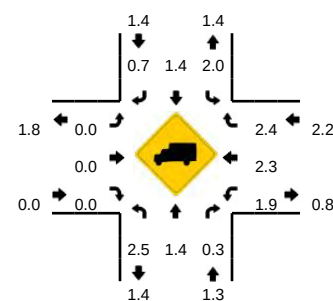
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Orchard Ave
CITY/STATE: Hayward, CA

QC JOB #: 13898108
DATE: Thu, Sep 08 2016



Peak-Hour: 4:50 PM -- 5:50 PM
Peak 15-Min: 5:25 PM -- 5:40 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Orchard Ave (Eastbound)				Orchard Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	132	30	1	14	78	11	8	9	11	5	0	17	16	17	1	354	
4:05 PM	10	140	27	0	13	113	12	5	17	26	7	0	15	13	26	1	425	
4:10 PM	2	142	23	2	9	104	16	3	17	17	1	0	14	5	20	1	376	
4:15 PM	4	130	15	2	12	63	5	4	12	19	3	0	13	17	27	3	329	
4:20 PM	4	111	20	2	19	109	9	3	9	13	2	0	12	15	14	3	345	
4:25 PM	7	132	22	0	15	112	15	2	7	22	8	0	19	14	23	0	398	
4:30 PM	6	131	34	2	18	95	10	3	9	16	1	1	22	9	22	0	379	
4:35 PM	4	100	18	0	16	99	9	1	9	8	7	0	18	11	15	0	315	
4:40 PM	7	116	20	2	15	86	4	4	7	34	3	1	9	16	16	1	341	
4:45 PM	1	119	20	3	18	123	11	5	7	24	6	0	13	11	16	0	377	
4:50 PM	5	130	26	1	6	102	7	2	6	20	5	0	13	16	12	1	352	
4:55 PM	5	108	24	2	17	106	11	1	9	27	8	1	15	11	16	0	361	4352
5:00 PM	4	95	21	1	18	107	25	3	11	28	3	0	19	23	21	0	379	4377
5:05 PM	10	99	29	1	22	65	9	4	8	21	10	0	9	19	29	0	335	4287
5:10 PM	5	132	34	0	23	131	20	2	7	22	4	0	14	12	23	1	430	4341
5:15 PM	3	144	27	1	17	110	12	3	14	15	4	0	11	12	14	0	387	4399
5:20 PM	6	117	23	0	20	107	10	4	9	28	2	0	9	13	8	1	357	4411
5:25 PM	7	145	23	0	16	128	12	5	8	17	3	0	14	11	16	0	405	4418
5:30 PM	7	124	30	0	20	91	8	4	10	28	4	0	8	15	20	0	369	4408
5:35 PM	4	139	33	1	16	122	8	2	11	22	4	0	14	16	13	0	405	4498
5:40 PM	7	130	20	2	15	107	8	5	7	12	3	0	17	6	19	0	358	4515
5:45 PM	8	140	36	1	19	82	11	3	5	22	7	0	12	21	15	0	382	4520
5:50 PM	4	109	25	3	21	105	21	5	9	6	3	0	11	15	11	0	348	4516
5:55 PM	2	102	20	4	24	91	9	4	12	23	4	0	18	14	15	0	342	4497
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	72	1632	344	4	208	1364	112	44	116	268	44	0	144	168	196	0	4716	
Heavy Trucks	4	12	0		4	24	4		0	0	0		4	0	8		60	
Pedestrians		12				4				12				4			32	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

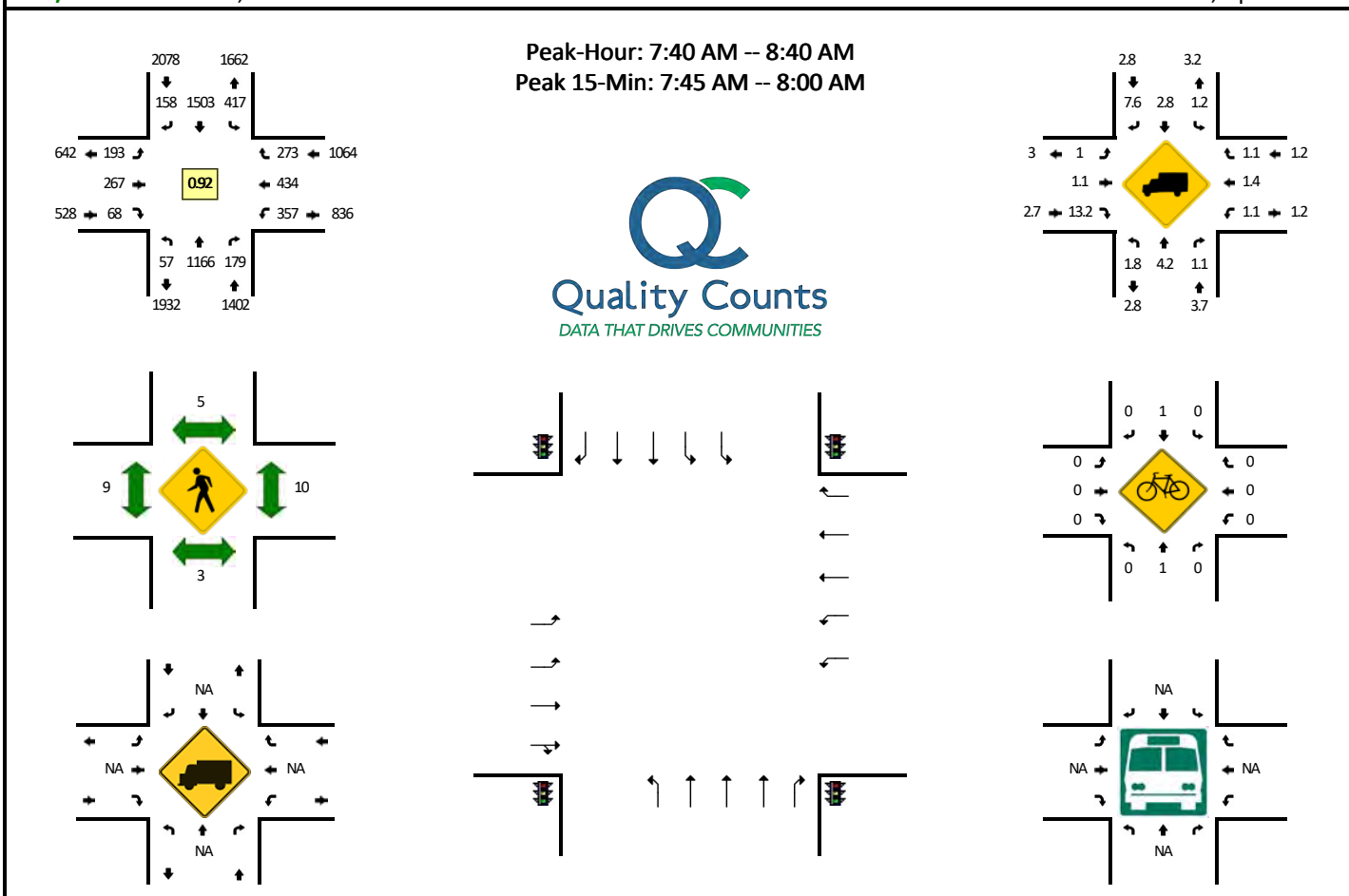
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Orchard Ave/Carlos Bee Blvd
CITY/STATE: Alameda, CA

QC JOB #: 14941001
DATE: Wed, Apr 10 2019



5-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Orchard Ave/Carlos Bee Blvd (Eastbound)				Orchard Ave/Carlos Bee Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	64	0	0	12	154	13	1	11	10	5	0	29	25	23	0	351	
7:05 AM	4	80	4	0	13	119	12	1	12	4	4	0	19	25	24	0	321	
7:10 AM	2	95	6	0	13	131	12	0	11	4	7	0	27	30	13	0	351	
7:15 AM	6	41	7	0	11	99	10	2	13	5	5	0	28	36	20	1	284	
7:20 AM	3	108	3	1	20	150	11	1	9	4	3	0	28	31	22	0	394	
7:25 AM	3	110	6	0	17	149	17	1	11	13	10	0	23	27	22	0	409	
7:30 AM	4	77	4	0	27	92	21	2	12	9	4	0	24	32	26	0	334	
7:35 AM	2	91	6	1	29	150	9	1	7	24	2	0	29	39	15	0	405	
7:40 AM	3	98	12	0	26	117	17	2	10	14	8	0	27	27	22	0	383	
7:45 AM	3	105	27	0	51	158	7	0	22	26	6	0	33	29	18	0	485	
7:50 AM	5	115	22	1	51	109	14	3	18	29	4	0	30	41	18	0	460	
7:55 AM	8	90	20	0	39	121	15	1	18	30	2	0	22	38	23	0	427	4604
8:00 AM	7	111	24	2	33	106	15	1	21	33	2	0	25	36	14	0	430	4683
8:05 AM	6	112	11	0	29	126	10	1	14	37	5	0	29	31	25	0	436	4798
8:10 AM	2	85	11	0	19	81	12	2	17	17	7	0	40	48	21	0	362	4809
8:15 AM	4	108	12	2	28	143	10	1	14	25	6	0	31	34	28	0	446	4971
8:20 AM	5	101	11	0	25	131	17	7	17	19	10	0	35	40	32	1	451	5028
8:25 AM	2	86	8	0	25	121	16	4	10	19	5	0	30	40	35	1	402	5021
8:30 AM	2	79	5	0	24	121	20	3	12	9	5	0	31	33	19	0	363	5050
8:35 AM	3	76	16	2	37	169	5	5	20	9	8	0	21	37	18	1	427	5072
8:40 AM	4	87	5	1	20	129	9	9	13	15	4	0	26	28	18	0	368	5057
8:45 AM	3	66	6	1	42	122	12	3	15	15	3	0	23	36	31	1	379	4951
8:50 AM	6	73	3	1	35	104	10	2	14	12	3	0	25	33	22	1	344	4835
8:55 AM	2	62	11	0	31	117	8	1	15	17	6	0	16	36	17	1	340	4748
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	64	1240	276	4	564	1552	144	16	232	340	48	0	340	432	236	0	5488	
Heavy Trucks	4	60	4		4	52	16		0	4	4		0	8	0		156	
Pedestrians		4				0				12				4			20	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

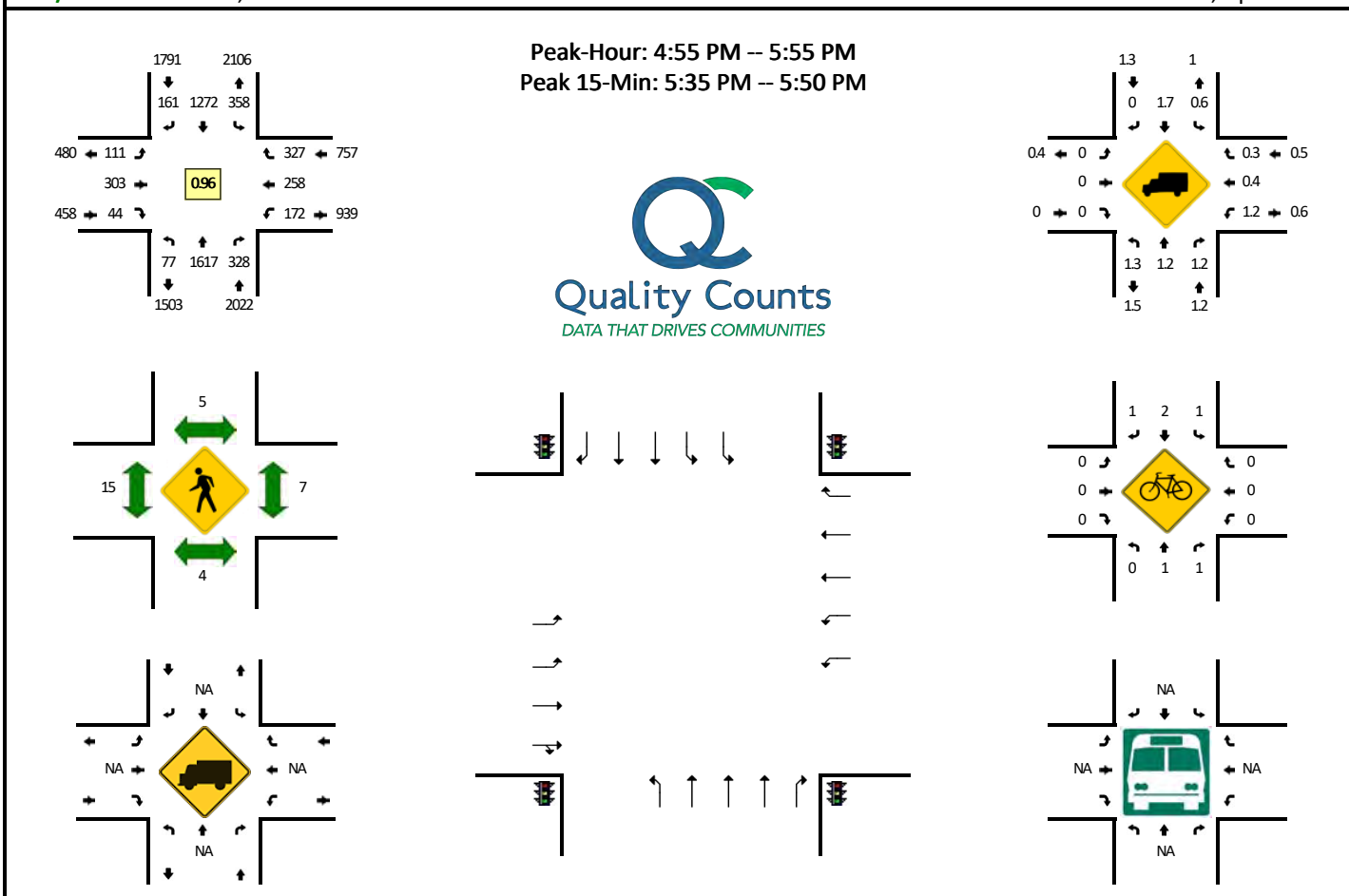
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Orchard Ave/Carlos Bee Blvd
CITY/STATE: Alameda, CA

QC JOB #: 14941002
DATE: Wed, Apr 10 2019



5-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Orchard Ave/Carlos Bee Blvd (Eastbound)				Orchard Ave/Carlos Bee Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	140	20	4	16	60	14	3	14	16	8	0	6	17	21	1	342	
4:05 PM	7	133	42	1	20	95	20	9	10	14	3	1	14	12	15	0	396	
4:10 PM	4	130	23	3	24	97	12	3	7	14	5	0	19	26	21	0	388	
4:15 PM	3	122	24	3	25	116	6	6	7	14	2	0	17	21	20	1	387	
4:20 PM	5	123	26	1	22	99	13	3	7	23	4	0	12	18	24	0	380	
4:25 PM	4	122	19	2	24	95	12	2	5	21	5	0	14	18	17	0	360	
4:30 PM	4	159	25	1	31	115	15	4	7	16	5	0	8	20	15	0	425	
4:35 PM	5	121	24	0	26	98	13	6	16	29	3	0	16	23	22	0	402	
4:40 PM	7	125	26	0	31	96	16	6	1	19	3	0	11	28	34	0	403	
4:45 PM	4	132	23	0	25	96	11	2	12	22	4	0	9	21	30	2	393	
4:50 PM	5	134	24	2	34	103	11	6	13	25	2	0	11	20	29	0	419	
4:55 PM	5	146	30	0	23	93	12	2	14	24	3	0	22	27	41	0	442	4737
5:00 PM	2	151	22	1	24	96	12	4	11	25	4	0	11	27	33	0	423	4818
5:05 PM	5	149	21	2	19	105	15	5	6	17	3	0	13	20	28	0	408	4830
5:10 PM	8	121	30	1	22	109	6	6	9	26	2	0	18	21	31	0	410	4852
5:15 PM	6	124	29	0	24	83	13	5	11	29	5	0	10	16	24	0	379	4844
5:20 PM	5	138	37	1	27	140	15	4	10	25	4	0	17	9	24	0	456	4920
5:25 PM	2	112	27	0	26	110	15	4	6	29	5	0	11	20	25	0	392	4952
5:30 PM	4	130	23	0	22	102	13	6	11	26	2	0	10	16	19	0	384	4911
5:35 PM	8	136	27	3	24	112	19	2	7	24	6	0	11	24	33	0	436	4945
5:40 PM	5	148	29	2	33	122	16	5	8	22	0	0	8	24	22	0	444	4986
5:45 PM	7	142	26	0	28	70	13	7	11	26	5	0	27	34	29	0	425	5018
5:50 PM	4	120	27	6	35	130	12	1	7	30	5	0	13	20	18	1	429	5028
5:55 PM	3	114	21	0	19	92	7	6	9	27	5	0	14	16	28	0	361	4947
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	80	1704	328	20	340	1216	192	56	104	288	44	0	184	328	336	0	5220	
Heavy Trucks	4	12	0		8	20	0		0	0	0		4	0	4		52	
Pedestrians		4				0				8				0			12	
Bicycles	0	0	1		0	1	0		0	0	0		0	0	0		2	
Railroad																		
Stopped Buses																		

Comments:

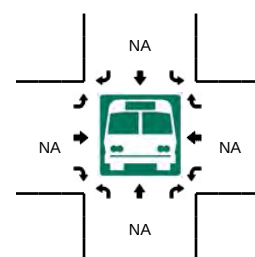
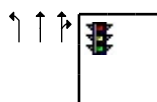
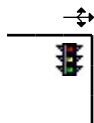
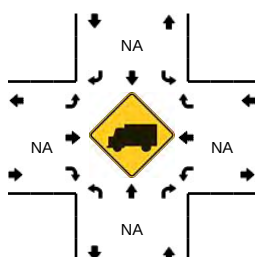
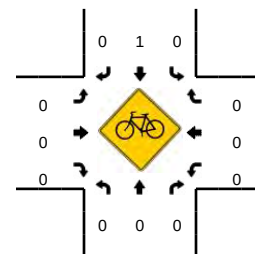
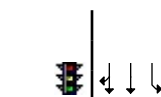
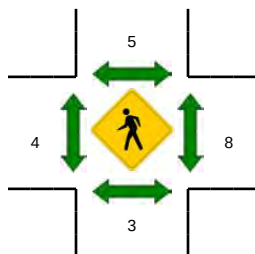
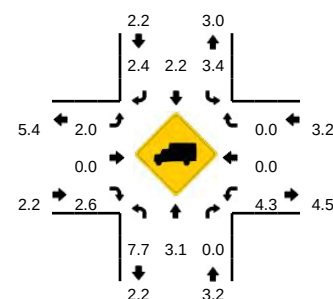
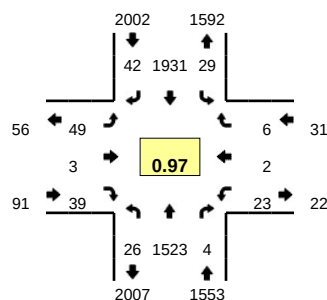
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Berry Ave
CITY/STATE: Hayward, CA

QC JOB #: 13898111
DATE: Thu, Sep 08 2016

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:20 AM -- 7:35 AM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Berry Ave (Eastbound)				Berry Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	79	0	2	1	199	2	0	1	0	0	0	4	0	0	0	289	
7:05 AM	2	96	0	0	0	182	5	0	5	0	0	0	2	1	1	0	294	
7:10 AM	0	76	0	4	2	189	4	0	3	0	2	0	1	0	0	0	281	
7:15 AM	2	119	1	0	1	192	2	0	2	0	3	0	3	0	1	0	326	
7:20 AM	0	98	0	1	3	183	1	1	5	0	4	0	1	0	0	0	297	
7:25 AM	1	99	0	1	0	203	3	0	1	0	4	0	2	0	1	0	315	
7:30 AM	2	133	1	1	3	181	2	1	2	0	2	0	2	1	0	0	331	
7:35 AM	0	141	1	4	1	127	5	0	9	1	2	0	5	1	0	0	297	
7:40 AM	0	122	0	0	0	150	4	0	3	2	5	0	3	0	0	0	289	
7:45 AM	1	127	0	0	1	167	4	0	2	0	5	0	0	0	0	0	307	
7:50 AM	1	130	0	0	3	152	2	3	5	0	4	0	0	0	0	0	300	
7:55 AM	1	121	1	3	0	138	1	6	4	0	5	0	4	0	0	0	284	3610
8:00 AM	1	149	0	1	1	156	10	1	5	0	2	0	0	0	2	0	328	3649
8:05 AM	2	138	0	2	2	144	4	2	5	0	0	0	2	0	1	0	302	3657
8:10 AM	1	146	0	1	0	138	4	0	6	0	3	0	1	0	1	0	301	3677
8:15 AM	2	123	2	0	1	147	4	2	3	0	1	0	0	1	0	0	286	3637
8:20 AM	0	115	1	0	6	159	3	5	4	0	1	0	3	0	0	0	297	3637
8:25 AM	4	74	1	0	2	127	4	4	3	0	2	0	1	1	0	0	223	3545
8:30 AM	2	137	1	2	2	144	3	2	1	0	2	0	1	0	0	0	297	3511
8:35 AM	1	96	1	1	2	153	7	0	3	0	4	0	1	0	1	0	270	3484
8:40 AM	1	100	1	0	0	155	1	0	3	0	2	0	1	0	0	0	264	3459
8:45 AM	0	93	1	1	1	170	4	1	1	0	3	0	1	1	0	0	277	3429
8:50 AM	1	111	1	2	2	186	0	1	1	0	2	0	2	0	0	0	309	3438
8:55 AM	4	76	0	0	1	163	3	4	3	0	1	0	2	1	0	0	258	3412
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	12	1320	4	12	24	2268	24	8	32	0	40	0	20	4	4	0	3772	
Heavy Trucks	8	36	0		4	60	0		0	0	0		4	0	0		112	
Pedestrians		0				16				16				8			40	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

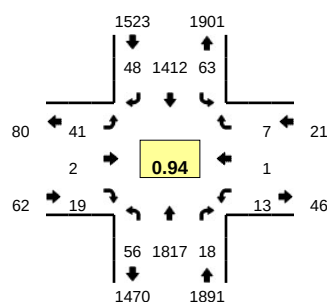
Comments:

Type of peak hour being reported: Intersection Peak

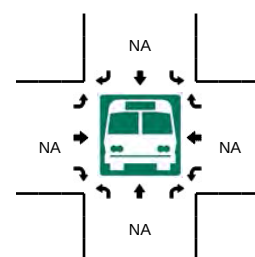
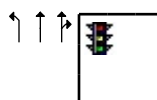
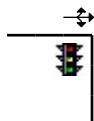
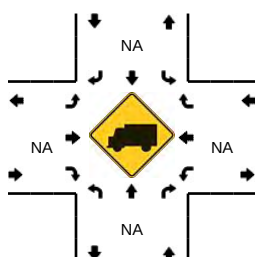
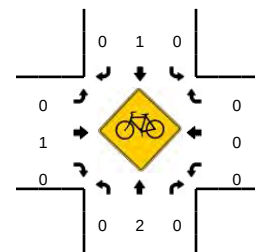
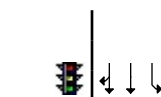
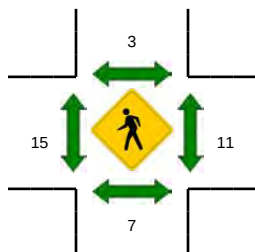
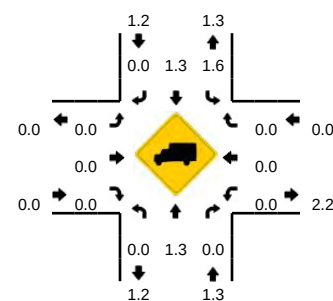
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Berry Ave
CITY/STATE: Hayward, CA

QC JOB #: 13898112
DATE: Thu, Sep 08 2016



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Berry Ave (Eastbound)				Berry Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	179	1	1	4	98	3	2	3	1	0	0	0	0	2	0	297	
4:05 PM	0	150	0	5	0	125	4	4	2	0	2	0	1	0	1	0	294	
4:10 PM	1	148	0	1	3	115	2	5	2	0	0	0	1	0	0	0	278	
4:15 PM	3	161	4	1	1	74	5	3	3	0	2	0	1	0	1	0	259	
4:20 PM	5	139	1	1	4	114	6	1	3	0	1	0	0	1	0	0	276	
4:25 PM	2	154	1	1	4	122	4	5	1	0	2	0	2	1	2	0	301	
4:30 PM	2	150	0	0	3	111	4	3	7	2	1	0	1	0	0	0	284	
4:35 PM	6	143	1	2	1	111	6	1	3	0	2	0	0	0	1	0	277	
4:40 PM	2	147	0	2	2	102	3	3	3	0	2	0	4	0	0	0	270	
4:45 PM	3	143	1	3	1	122	5	2	2	0	1	0	0	0	0	0	283	
4:50 PM	0	163	0	2	3	122	4	2	2	0	4	0	1	0	0	0	303	
4:55 PM	5	140	1	1	2	112	5	2	8	0	1	0	0	0	2	0	279	3401
5:00 PM	3	104	1	5	3	120	7	4	5	0	1	0	1	0	0	0	254	3358
5:05 PM	2	167	2	1	2	83	1	4	2	0	3	0	1	1	1	0	270	3334
5:10 PM	3	153	5	2	2	149	2	3	2	2	3	0	2	0	0	0	328	3384
5:15 PM	1	185	2	2	2	107	1	3	4	0	0	0	0	0	1	0	308	3433
5:20 PM	4	145	2	1	1	131	2	5	3	0	0	0	1	0	2	0	297	3454
5:25 PM	2	140	1	1	3	128	5	1	1	0	3	0	1	0	0	0	286	3439
5:30 PM	4	164	1	5	2	89	7	5	4	0	0	0	1	0	0	0	282	3437
5:35 PM	1	156	2	0	3	134	6	3	5	0	2	0	5	0	1	0	318	3478
5:40 PM	2	157	0	3	2	115	3	3	2	0	1	1	0	0	0	0	289	3497
5:45 PM	1	156	1	1	1	98	5	2	5	0	3	0	1	0	1	0	275	3489
5:50 PM	1	156	1	2	7	111	0	2	3	0	1	0	0	0	1	0	285	3471
5:55 PM	5	122	0	2	6	104	3	3	3	0	1	0	2	1	0	0	252	3444
Peak 15-Min Flowrates																		
	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	32	1932	36	20	20	1548	20	44	36	8	12	0	12	0	12	0	3732	
Heavy Trucks	0	16	0		0	8	0		0	0	0		0	0	0		24	
Pedestrians		4				0				20				16			40	
Bicycles	0	2	0		0	0	0		0	1	0		0	0	0		3	
Railroad																		
Stopped Buses																		

Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

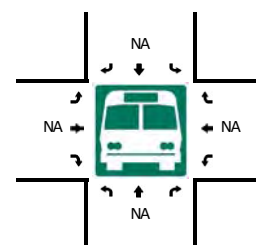
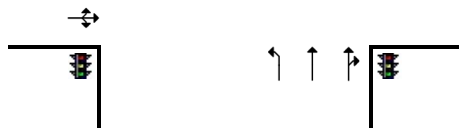
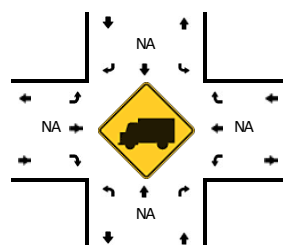
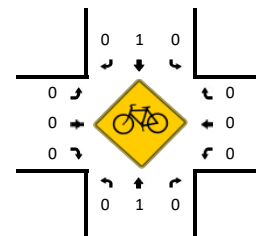
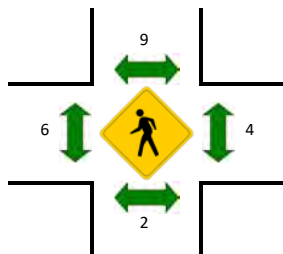
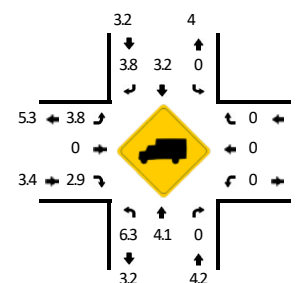
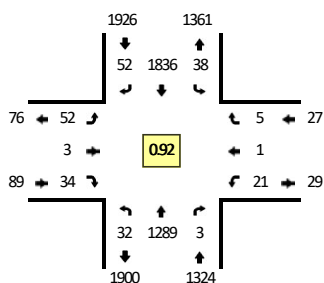
LOCATION: 2. Mission Blvd -- Berry Ave

CITY/STATE: Alameda, CA

QC JOB #: 14941003

DATE: Wed, Apr 10 2019

Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 7:40 AM -- 7:55 AM



5-Min Count Period Beginning At	2. Mission Blvd (Northbound)				2. Mission Blvd (Southbound)				Berry Ave (Eastbound)				Berry Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	68	0	1	2	182	4	1	4	0	0	0	0	0	0	0	265	
7:05 AM	1	77	0	0	2	158	2	1	4	0	1	0	2	0	1	0	249	
7:10 AM	3	95	0	0	0	153	1	0	5	0	2	0	5	0	0	0	264	
7:15 AM	0	85	0	0	0	151	2	1	0	0	3	0	1	0	0	0	243	
7:20 AM	0	93	0	2	0	160	0	2	5	0	0	0	3	0	0	0	265	
7:25 AM	0	96	0	0	0	166	4	0	1	1	3	0	0	0	0	0	271	
7:30 AM	2	98	1	0	0	123	2	0	2	0	7	0	1	0	0	0	236	
7:35 AM	0	80	0	3	0	165	1	1	5	0	5	0	3	0	0	0	263	
7:40 AM	2	129	0	1	1	169	4	1	2	0	3	0	1	0	1	0	314	
7:45 AM	2	122	0	1	1	168	5	0	3	0	3	0	2	0	1	0	308	
7:50 AM	0	118	0	1	3	147	4	1	8	0	2	0	3	1	1	0	289	
7:55 AM	1	88	1	0	1	139	2	1	12	0	3	0	2	0	1	0	251	3218
8:00 AM	3	147	0	1	2	146	3	0	5	0	5	0	2	0	0	0	314	3267
8:05 AM	1	121	1	0	1	138	2	2	1	0	3	0	4	0	1	0	275	3293
8:10 AM	2	76	0	0	0	142	11	1	4	0	0	0	1	0	0	0	237	3266
8:15 AM	4	130	1	1	3	145	5	1	6	0	1	0	0	0	0	0	297	3320
8:20 AM	1	97	0	0	3	168	6	2	3	2	3	0	2	0	0	0	287	3342
8:25 AM	2	98	0	0	2	135	4	2	4	0	4	0	4	0	0	0	255	3326
8:30 AM	3	65	0	3	5	162	1	4	0	0	2	0	0	0	0	0	245	3335
8:35 AM	2	98	0	1	1	177	5	0	4	1	5	0	0	0	0	0	294	3366
8:40 AM	1	77	0	0	2	168	5	3	1	0	0	0	0	0	0	0	257	3309
8:45 AM	1	75	0	0	1	121	2	3	2	0	0	0	0	0	2	0	207	3208
8:50 AM	0	69	0	0	0	156	1	2	4	0	3	0	1	0	0	0	236	3155
8:55 AM	0	81	3	2	0	117	5	1	1	0	1	0	0	0	0	0	211	3115
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	16	1476	0	12	20	1936	52	8	52	0	32	0	24	4	12	0	3644	
Heavy Trucks	4	56	0		0	44	4		4	0	4		0	0	0		116	
Pedestrians		0				12				16				0			28	
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

Comments:

Report generated on 4/18/2019 2:51 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

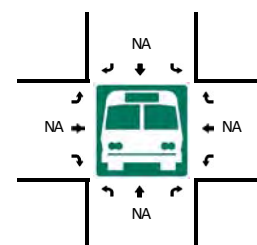
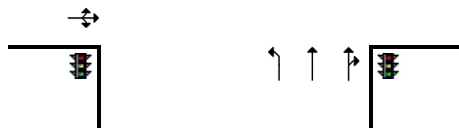
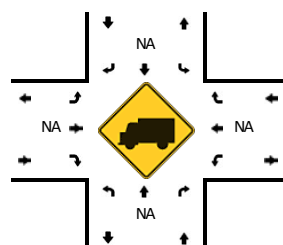
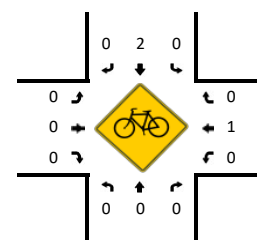
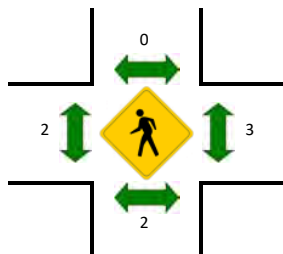
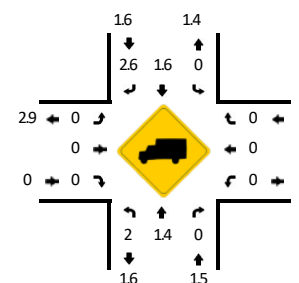
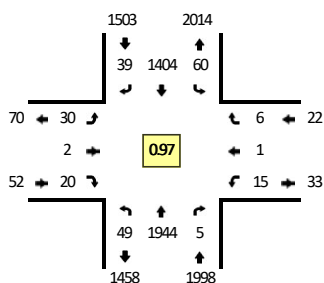
LOCATION: 2. Mission Blvd -- Berry Ave

CITY/STATE: Alameda, CA

QC JOB #: 14941004

DATE: Wed, Apr 10 2019

Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:35 PM -- 5:50 PM



5-Min Count Period Beginning At	2. Mission Blvd (Northbound)				2. Mission Blvd (Southbound)				Berry Ave (Eastbound)				Berry Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	165	0	1	0	72	2	1	4	0	2	0	1	0	0	0	252	
4:05 PM	1	173	0	2	3	99	2	5	2	0	2	0	2	0	0	0	291	
4:10 PM	1	148	2	1	4	126	3	1	1	0	0	0	2	0	2	0	291	
4:15 PM	2	153	0	2	3	124	4	3	4	0	2	0	1	0	1	0	299	
4:20 PM	2	148	1	1	2	106	3	2	2	0	2	0	2	0	2	0	273	
4:25 PM	4	142	0	3	3	107	6	4	1	0	4	0	1	0	1	0	276	
4:30 PM	2	181	0	0	1	122	1	2	2	0	1	0	1	0	0	0	313	
4:35 PM	6	137	0	2	3	103	2	4	1	0	1	0	0	0	2	0	261	
4:40 PM	4	153	2	1	0	111	5	1	6	0	1	0	2	0	1	0	287	
4:45 PM	0	162	0	0	2	99	3	0	4	0	2	0	0	0	2	0	274	
4:50 PM	3	153	1	3	3	123	1	3	2	0	1	0	1	0	0	0	294	
4:55 PM	4	171	0	0	1	111	2	6	3	1	0	0	0	0	0	0	299	3410
5:00 PM	1	170	0	3	3	98	3	2	2	0	1	0	2	0	0	0	285	3443
5:05 PM	5	177	2	2	0	114	4	2	4	0	4	0	0	1	1	0	316	3468
5:10 PM	3	150	1	0	2	129	4	2	1	0	1	0	1	0	1	0	295	3472
5:15 PM	3	163	1	0	2	91	6	3	2	1	0	0	1	0	0	0	273	3446
5:20 PM	2	151	0	3	2	143	5	2	2	0	2	0	3	0	1	0	316	3489
5:25 PM	1	147	0	3	5	119	2	5	4	0	1	0	1	0	1	0	289	3502
5:30 PM	0	157	1	1	4	99	7	2	3	0	2	0	2	0	2	0	280	3469
5:35 PM	4	163	0	4	0	129	1	3	2	0	5	0	3	0	0	0	314	3522
5:40 PM	1	173	0	1	4	120	2	2	4	0	3	0	1	0	0	0	311	3546
5:45 PM	3	168	0	2	1	117	1	2	3	0	1	0	0	0	0	0	298	3570
5:50 PM	3	154	0	0	2	134	2	3	0	0	0	0	1	0	0	0	299	3575
5:55 PM	2	137	1	5	2	116	1	2	1	0	2	0	1	0	1	0	271	3547
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	32	2016	0	28	20	1464	16	28	36	0	36	0	16	0	0	0	3692	
Heavy Trucks	0	16	0		0	24	0		0	0	0		0	0	0		40	
Pedestrians		0				0				0				12			12	
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

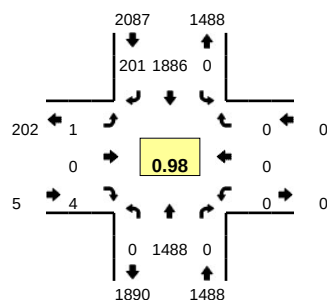
Comments:

Type of peak hour being reported: Intersection Peak

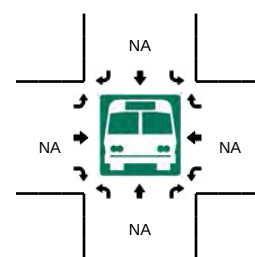
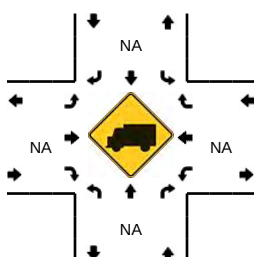
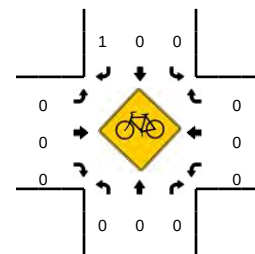
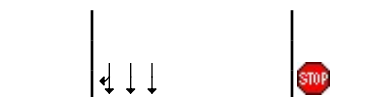
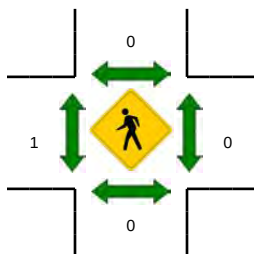
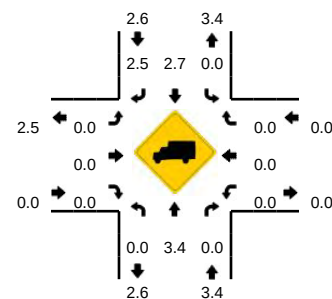
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Torrano Ave (North Offset)
CITY/STATE: Hayward, CA

QC JOB #: 13898101
DATE: Thu, Sep 08 2016



Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:25 AM -- 7:40 AM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Torrano Ave (North Offset) (Eastbound)				Torrano Ave (North Offset) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	77	0	0	0	195	9	0	0	0	0	0	0	0	0	0	281	
7:05 AM	0	100	0	0	0	192	7	0	0	0	0	0	0	0	0	0	299	
7:10 AM	0	107	0	0	0	181	14	0	0	0	0	1	0	0	0	0	303	
7:15 AM	0	96	0	0	0	207	13	0	0	0	0	0	0	0	0	0	316	
7:20 AM	0	99	0	0	0	162	8	0	0	0	2	0	0	0	0	0	271	
7:25 AM	0	103	0	0	0	202	11	0	0	0	0	0	0	0	0	0	316	
7:30 AM	0	135	0	0	0	167	17	0	0	0	1	0	0	0	0	0	320	
7:35 AM	0	143	0	0	0	130	5	0	0	0	0	0	0	0	0	0	278	
7:40 AM	0	122	0	0	0	144	17	0	0	0	0	0	0	0	0	0	283	
7:45 AM	0	130	0	0	0	154	28	0	0	0	0	0	0	0	0	0	312	
7:50 AM	0	134	0	0	0	132	14	0	0	0	1	0	0	0	0	0	281	
7:55 AM	0	138	0	0	0	130	23	0	0	0	0	0	0	0	0	0	291	3551
8:00 AM	0	139	0	0	0	139	26	0	0	0	0	0	0	0	0	0	304	3574
8:05 AM	0	142	0	0	0	138	25	0	0	0	0	0	0	0	0	0	305	3580
8:10 AM	0	153	0	0	0	125	10	0	0	0	3	0	0	0	0	0	291	3568
8:15 AM	0	125	0	0	0	130	20	0	0	0	1	0	0	0	0	0	276	3528
8:20 AM	0	125	0	0	0	165	12	0	0	0	0	0	0	0	0	0	302	3559
8:25 AM	0	88	0	0	0	131	7	0	0	0	0	0	0	0	0	0	226	3469
8:30 AM	0	126	0	0	0	157	5	0	0	0	2	0	0	0	0	0	290	3439
8:35 AM	0	108	0	0	0	162	4	0	0	0	0	0	0	0	0	0	274	3435
8:40 AM	0	95	0	0	0	136	7	0	0	0	3	0	0	0	0	0	241	3393
8:45 AM	0	98	0	0	0	156	18	0	0	0	1	0	0	0	0	0	273	3354
8:50 AM	0	119	0	0	0	173	22	0	0	0	0	0	0	0	0	0	314	3387
8:55 AM	0	82	0	0	0	149	6	0	0	0	0	0	0	0	0	0	237	3333
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
	0	1524	0	0	0	1996	132	0	0	0	4	0	0	0	0	0	3656	
	0	52	0	0	0	48	0	0	0	0	0	0	0	0	0	0	100	
	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses																		

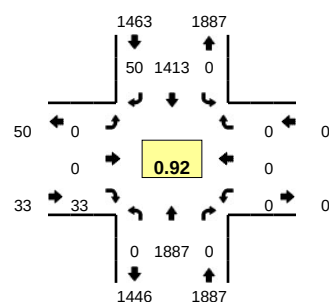
Comments:

Type of peak hour being reported: Intersection Peak

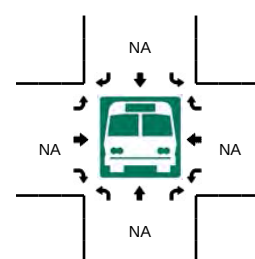
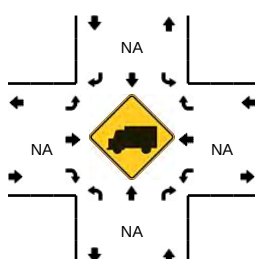
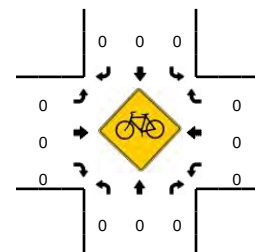
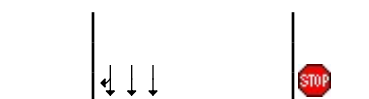
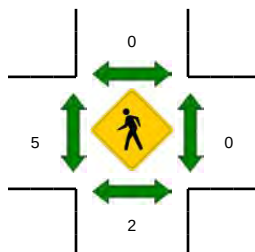
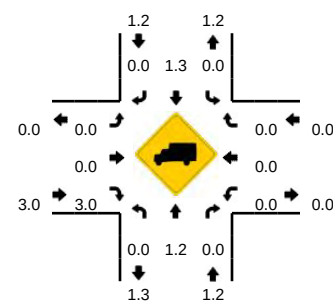
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Torrano Ave (North Offset)
CITY/STATE: Hayward, CA

QC JOB #: 13898102
DATE: Thu, Sep 08 2016



Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Torrano Ave (North Offset) (Eastbound)				Torrano Ave (North Offset) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	168	0	0	0	105	3	0	0	0	3	0	0	0	0	0	279	
4:05 PM	0	152	0	0	0	107	10	0	0	0	3	0	0	0	0	0	272	
4:10 PM	0	152	0	0	0	103	4	0	0	0	1	0	0	0	0	0	260	
4:15 PM	0	165	0	0	0	85	2	0	0	0	3	0	0	0	0	0	255	
4:20 PM	0	150	0	0	0	105	2	0	0	0	5	0	0	0	0	0	262	
4:25 PM	0	170	0	0	0	124	3	0	0	0	1	0	0	0	0	0	298	
4:30 PM	0	159	0	0	0	120	5	0	0	0	1	0	0	0	0	0	285	
4:35 PM	0	126	0	0	0	113	4	0	0	0	5	0	0	0	0	0	248	
4:40 PM	0	172	0	0	0	107	3	0	0	0	3	0	0	0	0	0	285	
4:45 PM	0	171	0	0	0	104	3	0	0	0	2	0	0	0	0	0	280	
4:50 PM	0	140	0	0	0	145	6	0	0	0	0	0	0	0	0	0	291	
4:55 PM	0	147	0	0	0	96	2	0	0	0	2	0	0	0	0	0	247	3262
5:00 PM	0	130	0	0	0	126	7	0	0	0	6	0	0	0	0	0	269	3252
5:05 PM	0	158	0	0	0	97	3	0	0	0	1	0	0	0	0	0	259	3239
5:10 PM	0	160	0	0	0	134	7	0	0	0	6	0	0	0	0	0	307	3286
5:15 PM	0	197	0	0	0	106	2	0	0	0	2	0	0	0	0	0	307	3338
5:20 PM	0	159	0	0	0	136	4	0	0	0	3	0	0	0	0	0	302	3378
5:25 PM	0	135	0	0	0	119	1	0	0	0	4	0	0	0	0	0	259	3339
5:30 PM	0	170	0	0	0	97	5	0	0	0	3	0	0	0	0	0	275	3329
5:35 PM	0	148	0	0	0	146	7	0	0	0	1	0	0	0	0	0	302	3383
5:40 PM	0	166	0	0	0	109	1	0	0	0	1	0	0	0	0	0	277	3375
5:45 PM	0	151	0	0	0	116	4	0	0	0	1	0	0	0	0	0	272	3367
5:50 PM	0	161	0	0	0	109	5	0	0	0	3	0	0	0	0	0	278	3354
5:55 PM	0	142	0	0	0	118	2	0	0	0	4	0	0	0	0	0	266	3373
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
	0	2064	0	0	0	1504	52	0	0	0	44	0	0	0	0	0	3664	
	0	24	0	0	0	8	0	0	0	0	0	0	0	0	0	0	32	
	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses																		

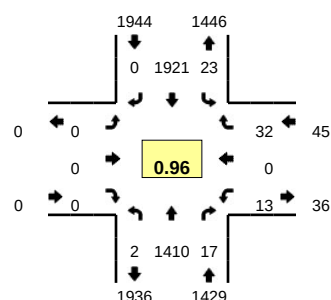
Comments:

Type of peak hour being reported: Intersection Peak

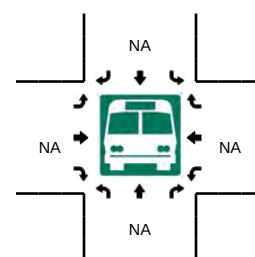
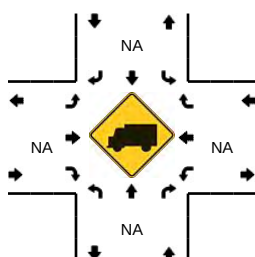
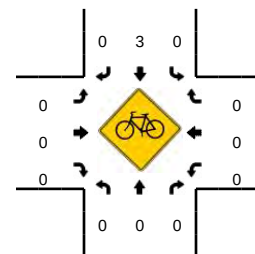
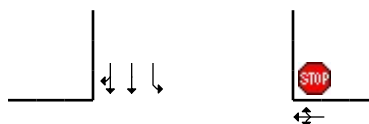
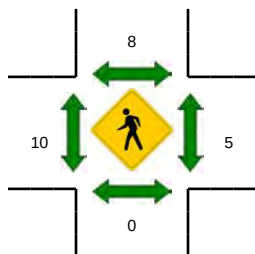
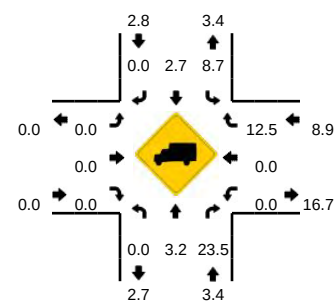
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Torrano Ave (South Offset)
CITY/STATE: Hayward, CA

QC JOB #: 13898103
DATE: Thu, Sep 08 2016



Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:25 AM -- 7:40 AM

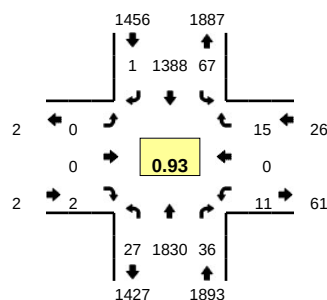


5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Torrano Ave (South Offset) (Eastbound)				Torrano Ave (South Offset) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	74	0	0	1	194	0	0	0	0	0	0	1	0	3	0	273	
7:05 AM	0	96	1	0	4	188	0	0	0	0	0	0	2	0	4	0	295	
7:10 AM	0	104	3	0	2	179	0	0	0	0	0	0	0	0	3	0	291	
7:15 AM	0	94	0	0	2	205	0	0	0	0	0	0	1	0	2	0	304	
7:20 AM	0	99	1	0	2	160	0	0	0	0	0	0	1	0	0	0	263	
7:25 AM	0	100	3	0	0	202	0	0	0	0	0	0	2	0	3	0	310	
7:30 AM	0	130	2	0	3	164	0	0	0	0	0	0	2	0	5	0	306	
7:35 AM	0	138	1	0	0	130	0	1	0	0	0	0	1	0	4	0	275	
7:40 AM	0	122	0	0	1	143	0	0	0	0	0	0	1	0	0	0	267	
7:45 AM	0	127	2	0	1	153	0	0	0	0	0	0	1	0	3	0	287	
7:50 AM	0	128	1	0	1	131	0	2	0	0	0	0	0	0	4	0	267	
7:55 AM	0	137	1	1	1	129	0	0	0	0	0	0	2	0	1	0	272	3410
8:00 AM	0	135	2	1	2	137	0	1	0	0	0	0	0	0	3	0	281	3418
8:05 AM	0	141	0	1	2	136	0	1	0	0	0	0	0	0	0	0	281	3404
8:10 AM	0	148	1	0	1	124	0	3	0	0	0	0	1	0	2	0	280	3393
8:15 AM	0	118	1	1	2	128	0	3	0	0	0	0	1	0	4	0	258	3347
8:20 AM	0	123	1	0	6	159	0	0	0	0	0	0	0	0	2	0	291	3375
8:25 AM	0	87	2	0	2	129	0	0	0	0	0	0	1	0	1	0	222	3287
8:30 AM	0	121	2	0	1	156	0	3	0	0	0	0	1	0	2	0	286	3267
8:35 AM	0	105	1	0	5	157	0	2	0	0	0	0	0	0	1	0	271	3263
8:40 AM	0	91	2	1	0	136	0	2	0	0	0	0	0	0	2	0	234	3230
8:45 AM	0	95	1	1	3	153	0	2	0	0	0	0	0	0	1	0	256	3199
8:50 AM	0	117	1	1	1	172	0	1	0	0	0	0	0	0	1	0	294	3226
8:55 AM	0	81	2	1	2	147	0	1	0	0	0	0	0	0	0	0	234	3188
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	1472	24	0	12	1984	0	4	0	0	0	0	20	0	48	0	3564	
Heavy Trucks	0	40	8		0	48	0		0	0	0		0	0	12		108	
Pedestrians	0				12				8				12				32	
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

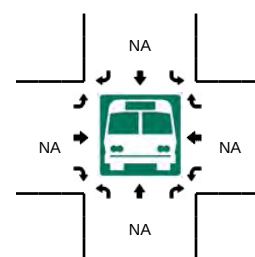
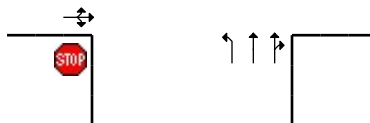
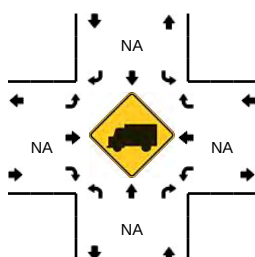
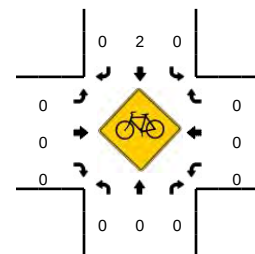
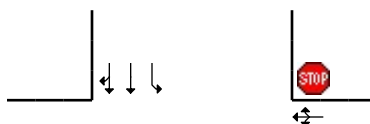
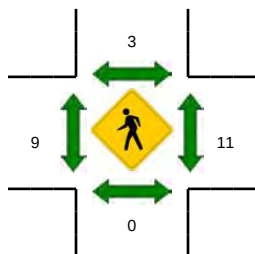
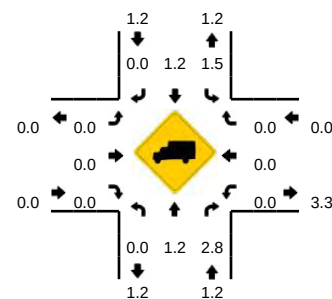
Comments:

LOCATION: Mission Blvd -- Torrano Ave (South Offset)
CITY/STATE: Hayward, CA

QC JOB #: 13898104
DATE: Thu, Sep 08 2016



Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

[illegible]

Comments:



Location: 3. Mission Blvd & Torrance Ave
 Date: 10/4/2019
 Site Code: 14941005

Start Time	Mission Blvd Southbound					Torrance Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrance Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left	U-Turn	Right	Thru	Left to Mitsubishi Dwy	Left	U-Turn	Right	Thru	Left	Left to Mitsubishi Dwy	U-Turn	Right to Mission Blvd	Right to Torrance Ave	Left to Mission Blvd	Left to Torrance Ave	U-Turn	Right to Mitsubishi Dwy	Right	Thru	Left	U-Turn
7:00 AM	11	0	186	0	0	2	0	0	0	1	0	77	0	0	0	0	0	0	0	0	1	0	0	0	0
7:05 AM	8	0	148	2	0	2	0	0	1	0	1	85	0	0	0	0	0	0	0	0	1	0	0	1	0
7:10 AM	7	0	150	0	1	1	0	0	0	0	2	80	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	5	0	150	4	0	4	0	0	0	0	1	87	0	0	0	0	0	0	0	0	0	0	0	0	0
7:20 AM	5	0	172	0	0	3	0	0	1	0	2	89	0	0	0	0	0	0	0	0	0	0	0	0	0
7:25 AM	5	0	151	3	1	1	0	0	0	0	2	89	0	0	0	0	0	0	0	0	0	0	0	1	1
7:30 AM	8	0	122	0	0	2	0	0	0	0	2	107	0	0	0	0	0	0	0	0	0	2	0	1	0
7:35 AM	12	0	163	2	0	2	0	0	0	0	0	102	0	0	1	0	0	0	0	0	0	1	0	1	1
7:40 AM	7	0	178	0	0	5	0	0	0	0	0	92	0	0	1	0	0	0	0	0	1	0	0	1	0
7:45 AM	9	0	157	0	0	4	0	0	0	0	2	131	0	0	1	0	0	0	0	0	0	0	1	0	0
7:50 AM	15	0	142	4	1	3	0	0	1	0	0	119	0	0	0	0	0	0	0	0	0	0	0	0	3
7:55 AM	16	0	121	2	1	2	0	0	1	0	1	125	0	0	2	0	0	0	0	0	0	1	0	0	0
8:00 AM	12	0	148	1	0	5	0	0	0	0	2	108	0	0	0	0	0	0	0	0	0	0	0	1	0
8:05 AM	17	0	127	2	0	2	0	0	3	0	2	114	0	0	0	0	0	0	0	0	0	0	0	1	0
8:10 AM	5	0	134	0	0	1	0	0	1	0	0	81	0	0	1	0	0	0	0	0	0	0	0	0	1
8:15 AM	7	0	130	1	1	3	0	0	1	0	3	127	0	0	1	0	0	0	0	0	0	0	1	1	0
8:20 AM	5	0	170	4	0	0	0	0	1	0	1	86	0	0	3	0	0	0	0	0	0	0	0	0	0
8:25 AM	7	0	140	0	2	0	0	0	0	0	2	104	0	0	0	0	0	0	0	0	0	1	0	2	0
8:30 AM	7	0	137	4	0	0	0	0	1	0	3	78	0	0	0	0	0	0	0	0	0	0	0	1	1
8:35 AM	4	0	181	6	1	1	0	0	0	0	0	86	0	0	0	0	0	0	0	0	1	0	1	0	0
8:40 AM	11	0	164	4	0	0	0	0	3	0	1	76	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	4	0	118	2	0	4	0	0	1	0	3	72	0	0	0	0	0	0	0	0	1	1	2	0	0
8:50 AM	6	0	151	0	2	0	0	0	1	0	2	70	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	1	3	111	5	0	1	0	0	2	0	0	79	0	0	2	0	0	0	0	0	0	0	2	1	1
Total	194	3	3551	46	10	48	0	0	18	0	32	2264	0	0	12	0	0	0	0	0	2	8	3	16	9

Peak Hour: 7:30 AM - 8:30 AM
 Peak 15: 7:40 AM - 7:55 AM
 PHF: 0.9259681



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941005

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left	U-Turn	Right	Thru	Left to Mitsubishi Dwy	Left	U-Turn	Right	Thru	Left	Left to Mitsubishi Dwy	U-Turn	Right to Mission Blvd	Right to Torrano Ave	Left to Mission Blvd	Left to Torrano Ave	U-Turn	Right to Mitsubishi Dwy	Right	Thru	Left	U-Turn
7:00 AM	9	0	180	0	0	2	0	0	0	0	0	76	0	0	0	0	0	0	0	0	1	0	0	0	0
7:05 AM	8	0	143	2	0	2	0	0	1	0	1	80	0	0	0	0	0	0	0	0	1	0	1	0	0
7:10 AM	7	0	147	0	1	1	0	0	0	0	2	78	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	5	0	142	3	0	4	0	0	0	0	1	83	0	0	0	0	0	0	0	0	0	0	0	0	0
7:20 AM	5	0	169	0	0	3	0	0	1	0	2	85	0	0	0	0	0	0	0	0	0	0	0	0	0
7:25 AM	5	0	147	3	1	1	0	0	0	0	2	86	0	0	0	0	0	0	0	0	0	0	1	1	0
7:30 AM	8	0	117	0	0	2	0	0	0	0	2	101	0	0	0	0	0	0	0	0	2	0	1	0	0
7:35 AM	12	0	156	2	0	2	0	0	0	0	0	97	0	0	1	0	0	0	0	0	1	0	1	1	0
7:40 AM	7	0	172	0	0	5	0	0	0	0	0	90	0	0	1	0	0	0	0	0	1	0	0	1	0
7:45 AM	8	0	155	0	0	4	0	0	0	0	1	124	0	0	1	0	0	0	0	0	0	1	0	0	0
7:50 AM	15	0	141	3	1	3	0	0	1	0	0	114	0	0	0	0	0	0	0	0	0	0	0	0	3
7:55 AM	16	0	113	2	1	2	0	0	1	0	1	121	0	0	2	0	0	0	0	0	1	0	0	0	0
8:00 AM	12	0	141	1	0	5	0	0	0	0	2	101	0	0	0	0	0	0	0	0	0	0	1	0	0
8:05 AM	16	0	122	1	0	2	0	0	3	0	2	108	0	0	0	0	0	0	0	0	0	0	1	0	0
8:10 AM	5	0	131	0	0	1	0	0	1	0	0	79	0	0	1	0	0	0	0	0	0	0	0	1	0
8:15 AM	7	0	128	1	1	3	0	0	1	0	3	120	0	0	1	0	0	0	0	0	0	1	1	0	0
8:20 AM	4	0	165	4	0	0	0	0	1	0	1	82	0	0	3	0	0	0	0	0	0	0	0	0	0
8:25 AM	7	0	136	0	2	0	0	0	0	0	2	100	0	0	0	0	0	0	0	0	0	0	2	0	0
8:30 AM	7	0	129	4	0	0	0	0	1	0	3	76	0	0	0	0	0	0	0	0	0	0	1	1	0
8:35 AM	4	0	176	6	1	1	0	0	0	0	0	83	0	0	0	0	0	0	0	0	1	0	1	0	0
8:40 AM	11	0	160	4	0	0	0	0	3	0	1	76	0	0	0	0	0	0	0	0	0	0	0	1	0
8:45 AM	4	0	112	2	0	4	0	0	1	0	3	65	0	0	0	0	0	0	0	0	1	1	2	0	0
8:50 AM	6	0	147	0	2	0	0	0	1	0	2	66	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	1	3	107	4	0	1	0	0	2	0	0	73	0	0	2	0	0	0	0	0	0	0	2	1	0
Total	189	3	3436	42	10	48	0	0	18	0	31	2164	0	0	12	0	0	0	0	0	2	7	3	16	9



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941005

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left		Right	Thru	Left to Mitsubishi Dwy	Left		Right	Thru	Left	Left to Mitsubishi Dwy		Right to Mission Blvd	Right to Torrano Ave	Left to Mission Blvd	Left to Torrano Ave		Right to Mitsubishi Dwy	Right	Thru	Left	
7:00 AM	2	0	6	0		0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
7:05 AM	0	0	5	0		0	0	0	0		0	5	0	0		0	0	0	0		0	0	0	0	
7:10 AM	0	0	3	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
7:15 AM	0	0	8	1		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
7:20 AM	0	0	3	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
7:25 AM	0	0	4	0		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
7:30 AM	0	0	5	0		0	0	0	0		0	6	0	0		0	0	0	0		0	0	0	0	
7:35 AM	0	0	7	0		0	0	0	0		0	5	0	0		0	0	0	0		0	0	0	0	
7:40 AM	0	0	6	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
7:45 AM	1	0	2	0		0	0	0	0		1	7	0	0		0	0	0	0		0	0	0	0	
7:50 AM	0	0	1	1		0	0	0	0		0	5	0	0		0	0	0	0		0	0	0	0	
7:55 AM	0	0	8	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
8:00 AM	0	0	7	0		0	0	0	0		0	7	0	0		0	0	0	0		0	0	0	0	
8:05 AM	1	0	5	1		0	0	0	0		0	6	0	0		0	0	0	0		0	0	0	0	
8:10 AM	0	0	3	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
8:15 AM	0	0	2	0		0	0	0	0		0	7	0	0		0	0	0	0		0	0	0	0	
8:20 AM	1	0	5	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
8:25 AM	0	0	4	0		0	0	0	0		0	4	0	0		0	0	0	0		0	1	0	0	
8:30 AM	0	0	8	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
8:35 AM	0	0	5	0		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
8:40 AM	0	0	4	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
8:45 AM	0	0	6	0		0	0	0	0		0	7	0	0		0	0	0	0		0	0	0	0	
8:50 AM	0	0	4	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
8:55 AM	0	0	4	1		0	0	0	0		0	6	0	0		0	0	0	0		0	0	0	0	
Total	5	0	115	4		0	0	0	0		1	100	0	0		0	0	0	0		0	1	0	0	



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941005

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left	Peds	Right	Thru	Left to Mitsubishi Dwy	Left	Peds	Right	Thru	Left	Left to Mitsubishi Dwy	Peds	Right to Mission Blvd	Right to Torrano Ave	Left to Mission Blvd	Left to Torrano Ave	Peds	Right to Mitsubishi Dwy	Right	Thru	Left	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
7:50 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:10 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:30 AM	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	2	0	9	0	0	0	1	7	0	1	0	0	0	0	0	0	0	20	0	0	0	0	2



Location: 3. Mission Blvd & Torrance Ave
 Date: 10/4/2019
 Site Code: 14941006

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left	U-Turn	Right	Thru	Left to Mitsubishi Dwy	Left	U-Turn	Right	Thru	Left	Left to Mitsubishi Dwy	U-Turn	Right to Mission Blvd	Right to Torrance Ave	Left to Mission Blvd	Left to Torrance Ave	U-Turn	Right to Mitsubishi Dwy	Right	Thru	Left	U-Turn
4:00 PM	7	0	80	0	0	1	0	0	1	0	1	173	0	0	2	1	0	1	0	0	0	0	0	2	0
4:05 PM	1	0	95	1	0	0	0	0	0	0	5	163	0	0	0	0	0	0	0	0	0	1	0	0	0
4:10 PM	3	0	124	4	3	2	0	0	0	0	1	148	0	0	1	0	0	1	0	0	0	0	0	1	0
4:15 PM	5	0	116	1	4	2	0	0	1	0	2	145	0	0	3	0	0	0	0	0	0	1	0	0	1
4:20 PM	5	0	112	0	1	1	0	0	0	0	2	159	0	0	1	0	0	0	0	0	0	1	0	2	0
4:25 PM	3	0	99	5	1	1	0	0	1	0	1	147	0	0	1	0	0	0	0	0	0	0	1	0	0
4:30 PM	5	1	100	4	1	3	0	0	0	0	2	158	0	0	2	0	0	0	0	0	0	3	0	4	0
4:35 PM	5	0	108	3	3	4	0	0	0	0	3	146	0	0	0	0	0	0	0	0	0	1	1	2	0
4:40 PM	2	0	105	2	1	1	0	0	1	0	3	141	0	0	4	0	0	0	0	0	0	2	0	1	0
4:45 PM	4	0	95	3	4	1	0	0	0	0	0	162	0	0	2	0	0	0	0	0	0	3	0	4	0
4:50 PM	3	0	118	3	0	1	0	0	0	0	4	155	0	0	0	1	0	0	0	0	0	3	0	3	0
4:55 PM	2	0	112	0	2	2	0	0	0	0	0	163	0	0	3	0	0	0	0	0	0	0	0	3	0
5:00 PM	5	0	100	3	0	2	0	0	0	0	1	172	0	0	3	0	0	0	0	0	0	3	2	2	0
5:05 PM	5	0	105	5	2	3	0	0	1	0	1	160	0	0	0	0	0	0	0	0	0	1	0	1	0
5:10 PM	4	0	123	0	1	2	0	0	2	0	4	147	0	0	2	1	0	0	0	0	0	1	0	4	0
5:15 PM	3	0	100	1	2	2	0	0	1	0	5	167	0	0	2	1	0	0	0	0	0	1	0	2	0
5:20 PM	7	1	122	5	2	0	0	0	0	0	1	143	0	0	0	0	0	1	0	0	0	0	0	0	0
5:25 PM	9	0	114	2	2	3	0	0	0	0	5	153	0	1	0	1	0	0	0	0	0	0	0	1	0
5:30 PM	2	0	99	3	2	1	0	0	0	0	4	150	0	0	2	0	0	0	0	0	0	1	0	2	0
5:35 PM	1	0	122	3	1	1	0	0	0	0	3	165	0	0	2	0	0	0	0	0	0	0	0	0	0
5:40 PM	7	2	117	5	0	2	0	0	1	0	3	171	0	0	2	4	0	0	0	0	0	0	0	1	0
5:45 PM	4	0	118	4	2	1	0	0	1	0	5	166	0	0	1	0	0	0	0	0	0	1	0	4	0
5:50 PM	6	0	112	3	1	0	0	0	0	0	2	147	0	0	1	0	0	0	0	0	1	1	0	2	0
5:55 PM	7	0	110	1	1	1	0	0	1	0	3	130	0	0	1	1	0	0	0	0	0	0	0	3	0
Total	105	4	2606	61	36	37	0	0	11	0	61	3731	0	2	34	11	0	3	0	0	2	23	4	45	0

Peak Hour: 4:50 PM - 5:50 PM
 Peak 15: 5:35 PM - 5:50 PM
 PHF: 0.948913



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941006

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left	U-Turn	Right	Thru	Left to Mitsubishi Dwy	Left	U-Turn	Right	Thru	Left	Left to Mitsubishi Dwy	U-Turn	Right to Mission Blvd	Right to Torrano Ave	Left to Mission Blvd	Left to Torrano Ave	U-Turn	Right to Mitsubishi Dwy	Right	Thru	Left	U-Turn
4:00 PM	7	0	76	0	0	1	0	0	1	0	1	172	0	0	2	1	0	1	0	0	0	0	0	2	0
4:05 PM	1	0	91	1	0	0	0	0	0	0	5	159	0	0	0	0	0	0	0	0	0	1	0	0	0
4:10 PM	3	0	118	4	3	2	0	0	0	0	1	144	0	0	0	1	0	0	1	0	0	0	0	1	0
4:15 PM	5	0	112	1	4	1	0	0	1	0	2	142	0	0	3	0	0	0	0	0	1	0	0	1	0
4:20 PM	5	0	109	0	1	1	0	0	0	0	2	152	0	0	1	0	0	0	0	0	0	1	0	2	0
4:25 PM	3	0	95	5	1	1	0	0	1	0	1	147	0	0	1	0	0	0	0	0	0	0	1	0	0
4:30 PM	5	1	100	4	1	3	0	0	0	0	2	152	0	0	2	0	0	0	0	0	0	3	0	4	0
4:35 PM	5	0	107	3	3	4	0	0	0	0	3	143	0	0	0	0	0	0	0	0	0	1	1	2	0
4:40 PM	2	0	101	2	1	0	0	0	0	0	3	139	0	0	4	0	0	0	0	0	0	2	0	1	0
4:45 PM	3	0	92	3	4	1	0	0	0	0	0	160	0	0	2	0	0	0	0	0	0	3	0	4	0
4:50 PM	3	0	116	2	0	1	0	0	0	0	4	155	0	0	0	1	0	0	0	0	0	3	0	3	0
4:55 PM	2	0	111	0	2	2	0	0	0	0	0	157	0	0	3	0	0	0	0	0	0	0	0	3	0
5:00 PM	5	0	96	3	0	2	0	0	0	0	1	171	0	0	3	0	0	0	0	0	0	2	2	2	0
5:05 PM	4	0	104	5	2	3	0	0	1	0	1	159	0	0	0	0	0	0	0	0	0	1	0	1	0
5:10 PM	4	0	122	0	1	2	0	0	2	0	4	144	0	0	2	1	0	0	0	0	0	1	0	4	0
5:15 PM	3	0	99	1	2	2	0	0	1	0	5	165	0	0	2	1	0	0	0	0	0	1	0	2	0
5:20 PM	7	1	120	5	2	0	0	0	0	0	1	140	0	0	0	0	0	1	0	0	0	0	0	0	0
5:25 PM	9	0	112	2	2	3	0	0	0	0	5	153	0	1	0	1	0	0	0	0	0	0	0	1	0
5:30 PM	2	0	95	3	2	1	0	0	0	0	4	148	0	0	2	0	0	0	0	0	0	1	0	2	0
5:35 PM	1	0	121	3	1	1	0	0	0	0	3	163	0	0	2	0	0	0	0	0	0	0	0	0	0
5:40 PM	7	2	114	5	0	2	0	0	1	0	3	170	0	0	2	4	0	0	0	0	0	0	0	1	0
5:45 PM	4	0	116	4	2	1	0	0	1	0	5	164	0	0	1	0	0	0	0	0	0	1	0	4	0
5:50 PM	6	0	112	2	1	0	0	0	0	0	2	144	0	1	0	1	0	0	0	0	1	1	0	2	0
5:55 PM	7	0	110	1	1	1	0	0	1	0	3	129	0	0	1	1	0	0	0	0	0	0	0	3	0
Total	103	4	2549	59	36	35	0	0	10	0	61	3672	0	2	34	11	0	3	0	0	2	22	4	45	0



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941006

Start Time	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound				
	Right	Right to Mitsubishi Dwy	Thru	Left		Right	Thru	Left to Mitsubishi Dwy	Left		Right	Thru	Left	Left to Mitsubishi Dwy		Right to Mission Blvd	Right to Torrano Ave	Left to Mission Blvd	Left to Torrano Ave		Right to Mitsubishi Dwy	Right	Thru	Left	
4:00 PM	0	0	4	0		0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
4:05 PM	0	0	4	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
4:10 PM	0	0	6	0		0	0	0	0		0	4	0	0		0	0	0	0		0	0	0	0	
4:15 PM	0	0	4	0		1	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
4:20 PM	0	0	3	0		0	0	0	0		0	7	0	0		0	0	0	0		0	0	0	0	
4:25 PM	0	0	4	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
4:30 PM	0	0	0	0		0	0	0	0		0	6	0	0		0	0	0	0		0	0	0	0	
4:35 PM	0	0	1	0		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
4:40 PM	0	0	4	0		1	0	0	1		0	2	0	0		0	0	0	0		0	0	0	0	
4:45 PM	1	0	3	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
4:50 PM	0	0	2	1		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
4:55 PM	0	0	1	0		0	0	0	0		0	6	0	0		0	0	0	0		0	0	0	0	
5:00 PM	0	0	4	0		0	0	0	0		0	1	0	0		0	0	0	0		0	1	0	0	
5:05 PM	1	0	1	0		0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
5:10 PM	0	0	1	0		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
5:15 PM	0	0	1	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
5:20 PM	0	0	2	0		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
5:25 PM	0	0	2	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
5:30 PM	0	0	4	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
5:35 PM	0	0	1	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
5:40 PM	0	0	3	0		0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
5:45 PM	0	0	2	0		0	0	0	0		0	2	0	0		0	0	0	0		0	0	0	0	
5:50 PM	0	0	0	1		0	0	0	0		0	3	0	0		0	0	0	0		0	0	0	0	
5:55 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
Total	2	0	57	2		2	0	0	1		0	59	0	0		0	0	0	0		0	1	0	0	



Location: 3. Mission Blvd & Torrano Ave

Date: 10/4/2019

Site Code: 14941006

	Mission Blvd Southbound					Torrano Ave Westbound					Mission Blvd Northbound					Hayward Mitsubishi Dwy Northeastbound					Torrano Ave Eastbound					
	Right	Right to Mitsubishi Dwy	Thru	Left	Peds	Right	Thru	Left to Mitsubishi Dwy	Left	Peds	Right	Thru	Left	Left to Mitsubishi Dwy	Peds	Right to Mission Blvd	Right to Torrono Ave	Left to Mission Blvd	Left to Torrono Ave	Peds	Right to Mitsubishi Dwy	Right	Thru	Left	Peds	
4:00 PM	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:10 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:25 PM	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:35 PM	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
4:40 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	
4:50 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	
4:55 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:35 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:50 PM	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	1	
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	
Total	2	0	4	0	16	0	0	0	0	5	0	4	0	0	0	0	0	0	0	20	0	0	0	0	13	

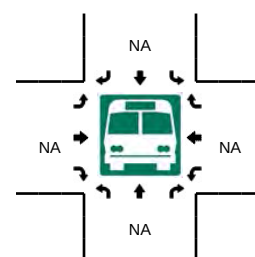
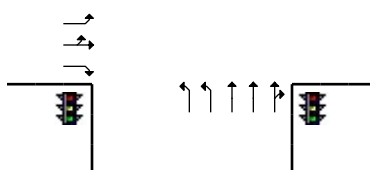
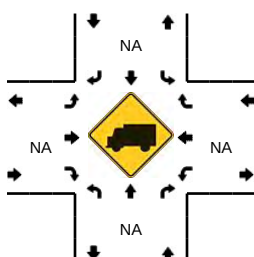
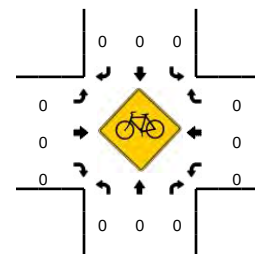
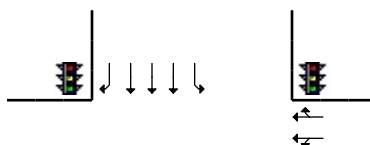
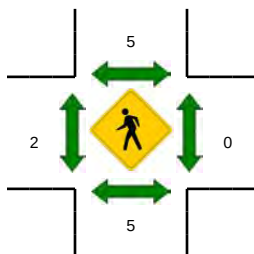
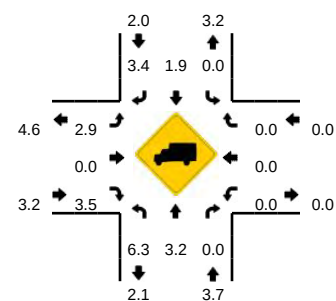
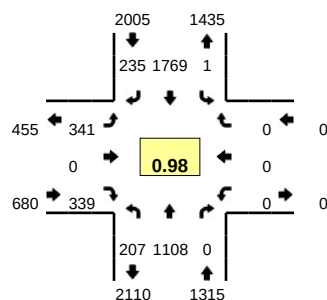
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Tennyson Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898109
DATE: Thu, Sep 08 2016

Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:20 AM -- 7:35 AM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	13	65	0	0	0	215	16	0	13	0	24	3	0	0	0	0	349	
7:05 AM	9	74	0	0	0	203	14	1	22	0	28	0	0	0	0	0	351	
7:10 AM	10	84	0	1	0	148	12	0	17	0	29	2	0	0	0	0	303	
7:15 AM	15	69	0	0	0	169	15	0	18	0	29	1	0	0	0	0	316	
7:20 AM	24	98	0	0	0	177	18	0	16	0	28	0	0	0	0	0	361	
7:25 AM	17	97	0	0	0	147	16	0	23	0	26	1	0	0	0	0	327	
7:30 AM	22	97	0	0	0	118	16	0	31	0	48	2	0	0	0	0	334	
7:35 AM	16	90	0	0	0	133	27	0	28	0	19	1	0	0	0	0	314	
7:40 AM	15	108	0	0	0	117	24	0	41	0	27	0	0	0	0	0	332	
7:45 AM	18	132	0	1	0	117	25	0	39	0	27	2	0	0	0	0	361	
7:50 AM	20	112	0	0	0	102	21	0	44	0	23	2	0	0	0	0	324	
7:55 AM	26	82	0	0	0	123	31	0	34	0	31	1	0	0	0	0	328	4000
8:00 AM	15	104	0	1	0	119	21	0	37	0	34	1	0	0	0	0	332	3983
8:05 AM	11	94	0	0	0	122	28	0	44	0	31	0	0	0	0	0	330	3962
8:10 AM	29	95	0	3	0	135	16	0	21	0	30	0	0	0	0	0	329	3988
8:15 AM	15	70	0	1	0	158	26	1	18	0	25	1	0	0	0	0	315	3987
8:20 AM	17	72	0	0	0	143	32	0	16	0	35	5	0	0	0	0	320	3946
8:25 AM	26	75	0	2	0	102	18	0	30	0	40	2	0	0	0	0	295	3914
8:30 AM	18	81	0	0	0	147	25	0	19	0	26	0	0	0	0	0	316	3896
8:35 AM	13	64	0	0	0	159	22	2	21	0	18	1	0	0	0	0	300	3882
8:40 AM	15	77	0	0	0	95	25	0	14	0	19	0	0	0	0	0	245	3795
8:45 AM	16	76	0	0	0	153	17	0	16	0	18	0	0	0	0	0	296	3730
8:50 AM	17	61	0	1	0	127	24	0	31	0	17	2	0	0	0	0	280	3686
8:55 AM	13	81	0	0	0	116	16	1	21	0	22	1	0	0	0	0	271	3629
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	252	1168	0	0	0	1768	200	0	280	0	408	12	0	0	0	0	4088	
Heavy Trucks	20	40	0		0	32	8		8	0	12		0	0	0		120	
Pedestrians	8				0				0				0				8	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

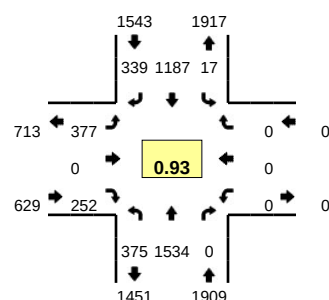
Comments:

Type of peak hour being reported: Intersection Peak

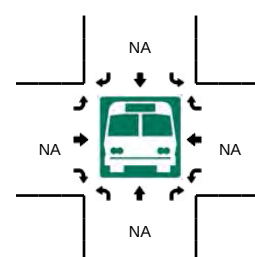
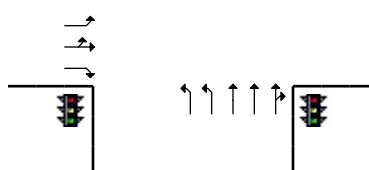
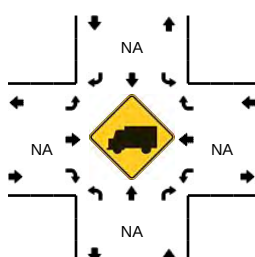
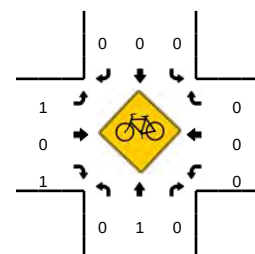
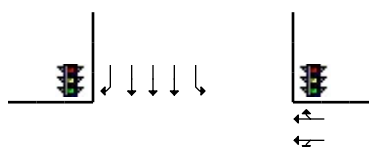
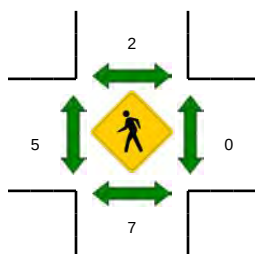
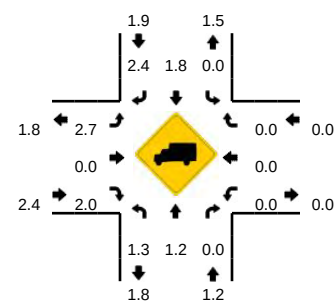
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Tennyson Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898110
DATE: Thu, Sep 08 2016



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	20	143	0	0	0	99	13	1	39	0	23	0	0	0	0	0	338	
4:05 PM	20	152	0	0	0	71	24	1	18	0	15	0	0	0	0	0	301	
4:10 PM	27	96	0	1	0	86	28	0	32	0	16	1	0	0	0	0	287	
4:15 PM	35	152	0	3	0	87	20	2	18	0	14	0	0	0	0	0	331	
4:20 PM	22	137	0	0	0	94	25	0	18	0	25	1	0	0	0	0	322	
4:25 PM	24	137	0	0	0	77	24	1	34	0	22	0	0	0	0	0	319	
4:30 PM	44	127	0	3	0	64	23	1	29	0	20	0	0	0	0	0	311	
4:35 PM	22	140	0	4	0	120	22	0	30	0	18	0	0	0	0	0	356	
4:40 PM	22	113	0	0	0	82	35	3	30	0	25	1	0	0	0	0	311	
4:45 PM	29	148	0	3	0	83	32	0	21	0	20	0	0	0	0	0	336	
4:50 PM	39	128	0	0	0	116	28	1	30	0	20	1	0	0	0	0	363	
4:55 PM	24	94	0	0	0	93	29	2	34	0	14	1	0	0	0	0	291	3866
5:00 PM	29	85	0	2	0	70	17	1	37	0	21	0	0	0	0	0	262	3790
5:05 PM	30	146	0	0	0	102	25	2	32	0	15	3	0	0	0	0	355	3844
5:10 PM	25	151	0	2	0	124	33	2	16	0	24	3	0	0	0	0	380	3937
5:15 PM	31	137	0	1	0	84	31	0	43	0	29	1	0	0	0	0	357	3963
5:20 PM	42	100	0	0	0	92	25	3	28	0	21	0	0	0	0	0	311	3952
5:25 PM	36	160	0	0	0	135	34	0	29	0	22	0	0	0	0	0	416	4049
5:30 PM	34	132	0	0	0	86	28	3	36	0	23	1	0	0	0	0	343	4081
5:35 PM	35	115	0	2	0	75	21	2	41	0	21	0	0	0	0	0	312	4037
5:40 PM	28	147	0	1	0	102	25	1	23	0	21	0	0	0	0	0	348	4074
5:45 PM	29	120	0	1	0	94	26	3	28	0	25	0	0	0	0	0	326	4064
5:50 PM	21	117	0	1	0	89	41	2	43	0	21	1	0	0	0	0	336	4037
5:55 PM	41	119	0	1	0	104	27	1	26	0	12	0	0	0	0	0	331	4077
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	344	1736	0	12	0	1240	356	16	364	0	272	28	0	0	0	0	4368	
Heavy Trucks	0	12	0		0	20	12		8	0	4		0	0	0		56	
Pedestrians	12				0				4				0				16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

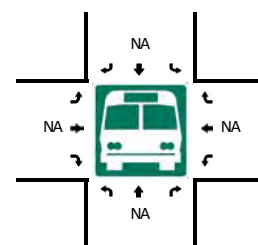
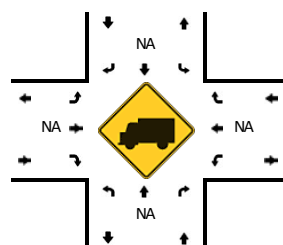
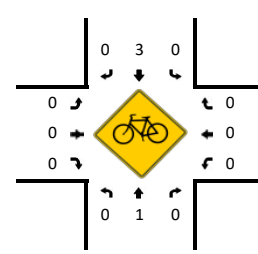
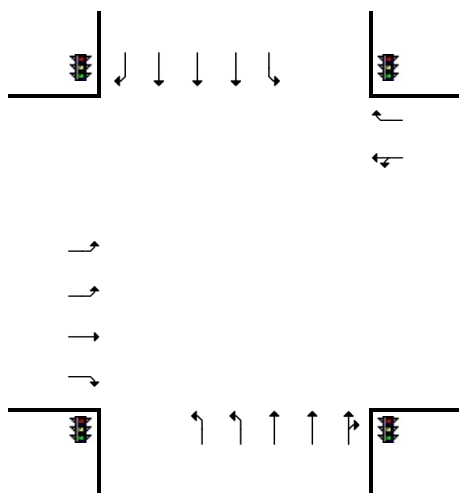
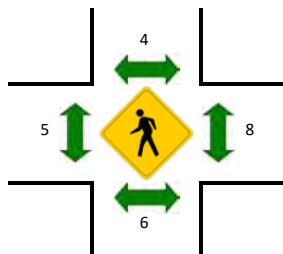
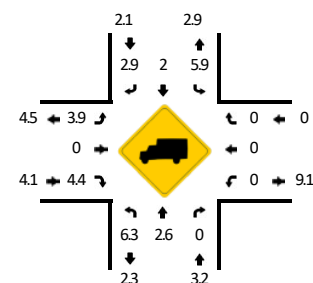
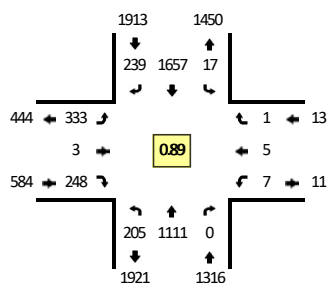
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Tennyson Rd**CITY/STATE:** Alameda, CA**QC JOB #:** 14937705**DATE:** Wed, Apr 10 2019

Peak-Hour: 7:15 AM -- 8:15 AM
 Peak 15-Min: 7:40 AM -- 7:55 AM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	10	47	0	1	0	159	14	1	24	0	19	0	0	0	0	0	275	
7:05 AM	6	73	0	1	0	214	26	0	20	1	17	0	0	0	0	0	358	
7:10 AM	18	37	0	0	0	122	16	3	15	0	28	1	0	0	0	0	240	
7:15 AM	11	86	0	1	1	170	8	1	16	0	19	0	1	2	0	0	316	
7:20 AM	16	86	0	0	0	104	11	1	21	0	18	1	0	0	0	0	258	
7:25 AM	12	82	0	0	2	153	15	0	21	0	18	0	0	0	0	0	303	
7:30 AM	12	77	0	1	1	94	12	1	27	0	21	0	1	0	0	0	247	
7:35 AM	8	102	0	0	0	145	11	0	29	0	22	0	0	0	0	0	317	
7:40 AM	14	94	0	0	0	172	19	1	32	0	17	0	2	0	0	0	351	
7:45 AM	14	157	0	0	0	136	28	0	23	1	19	0	0	0	1	0	379	
7:50 AM	18	117	0	0	0	122	17	1	38	1	29	0	1	1	0	0	345	
7:55 AM	25	75	0	1	1	129	24	3	28	0	21	1	1	0	0	0	309	3698
8:00 AM	17	94	0	3	1	172	32	0	25	1	16	1	1	0	0	0	363	3786
8:05 AM	25	78	0	1	1	132	35	0	41	0	29	1	0	1	0	0	344	3772
8:10 AM	24	63	0	2	1	128	27	1	28	0	19	0	0	1	0	0	294	3826
8:15 AM	20	65	0	1	0	132	18	1	28	1	23	2	0	0	0	0	291	3801
8:20 AM	11	53	0	0	1	123	19	3	24	0	17	1	0	1	0	0	253	3796
8:25 AM	18	77	0	1	0	137	14	0	22	0	29	1	1	1	0	0	301	3794
8:30 AM	17	53	0	0	0	120	13	2	21	0	20	1	0	1	0	0	248	3795
8:35 AM	13	71	0	0	0	125	23	0	27	0	19	1	0	0	0	0	279	3757
8:40 AM	10	57	0	0	0	135	14	1	13	0	19	0	0	0	0	0	249	3655
8:45 AM	11	64	0	0	0	125	24	1	16	0	15	0	0	1	0	0	257	3533
8:50 AM	13	43	0	0	0	115	20	1	22	0	11	0	1	1	2	0	229	3417
8:55 AM	8	53	0	0	0	114	23	0	18	0	16	0	1	0	0	0	233	3341
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	184	1472	0	0	0	1720	256	8	372	8	260	0	12	4	4	0	4300	
Heavy Trucks	16	28	0	0	0	32	8	0	12	0	16	0	0	0	0	0	112	
Pedestrians	8	8	0	0	8	8	0	0	8	8	0	0	12	12	0	0	36	
Bicycles	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

Comments:

Report generated on 4/18/2019 3:02 PM

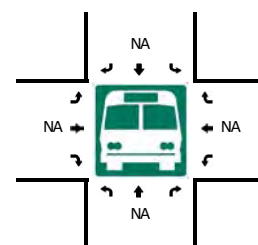
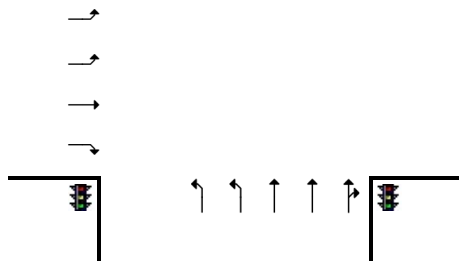
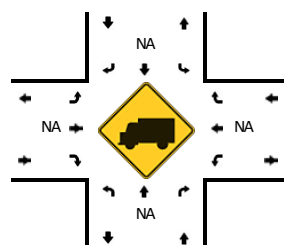
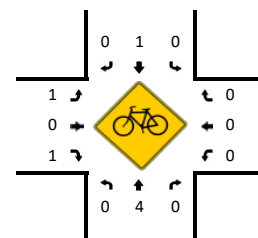
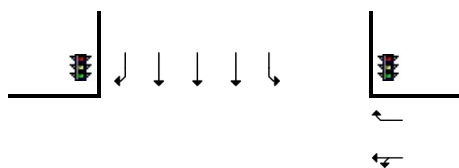
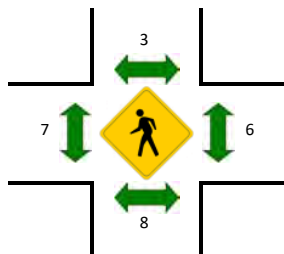
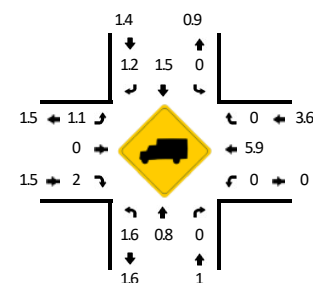
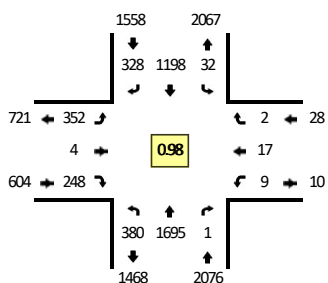
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Tennyson Rd**CITY/STATE:** Alameda, CA**QC JOB #:** 14937706**DATE:** Wed, Apr 10 2019

Peak-Hour: 4:50 PM -- 5:50 PM
Peak 15-Min: 5:20 PM -- 5:35 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	31	135	0	3	0	92	30	0	26	0	14	0	1	2	0	0	334	
4:05 PM	31	132	0	1	0	80	13	2	27	0	15	0	0	0	3	0	304	
4:10 PM	14	120	0	0	0	85	17	0	32	1	20	0	0	0	0	0	289	
4:15 PM	35	136	1	1	0	100	24	3	27	0	19	2	0	0	0	0	348	
4:20 PM	25	154	0	1	3	84	33	2	40	0	26	0	0	1	0	0	369	
4:25 PM	24	124	0	0	1	100	31	2	15	0	11	1	1	2	2	0	314	
4:30 PM	20	142	0	3	1	84	25	1	26	2	32	0	1	0	1	0	338	
4:35 PM	19	152	0	1	0	74	16	2	41	1	12	2	0	3	2	0	325	
4:40 PM	23	148	0	1	0	113	22	2	25	0	19	1	0	0	1	0	355	
4:45 PM	27	159	0	1	1	74	21	2	27	1	18	1	1	1	0	0	334	
4:50 PM	42	129	0	0	0	100	25	2	34	1	12	0	1	2	0	0	348	
4:55 PM	28	146	0	1	0	107	27	2	32	0	27	3	1	5	0	0	379	4037
5:00 PM	28	143	0	1	0	97	33	4	23	0	12	0	0	1	1	0	343	4046
5:05 PM	31	137	0	2	2	78	27	1	38	0	26	3	0	1	0	0	346	4088
5:10 PM	33	145	1	1	0	108	30	1	21	0	24	1	1	2	0	0	368	4167
5:15 PM	26	136	0	0	0	103	29	2	36	0	28	2	0	0	0	0	362	4181
5:20 PM	29	153	0	1	1	99	21	3	20	0	22	0	0	1	0	0	350	4162
5:25 PM	33	134	0	0	0	111	31	1	29	0	19	0	0	0	0	0	358	4206
5:30 PM	33	157	0	2	2	86	29	2	34	0	28	0	0	2	0	0	375	4243
5:35 PM	25	145	0	0	0	97	23	2	25	1	20	0	0	1	0	0	339	4257
5:40 PM	34	137	0	2	0	96	23	2	16	0	13	0	3	1	0	0	327	4229
5:45 PM	25	133	0	3	0	116	30	5	35	2	17	0	3	1	1	0	371	4266
5:50 PM	28	145	0	2	0	81	26	0	28	0	18	2	0	1	1	0	332	4250
5:55 PM	25	143	0	0	0	100	22	4	10	0	21	0	4	1	0	0	330	4201
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	380	1776	0	12	12	1184	324	24	332	0	276	0	0	12	0	0	4332	
Heavy Trucks	4	12	0		0	24	8		4	0	4		0	0	0		56	
Pedestrians		8				0				0				8			16	
Bicycles	0	4	0		0	1	0		0	0	0		0	0	0		5	
Railroad																		
Stopped Buses																		

Comments:

Report generated on 4/18/2019 3:02 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Mission Blvd @ Harder Rd
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016

LATITUDE 37.651118°
LONGITUDE -122.067056°
WEATHER Sunny and Clear

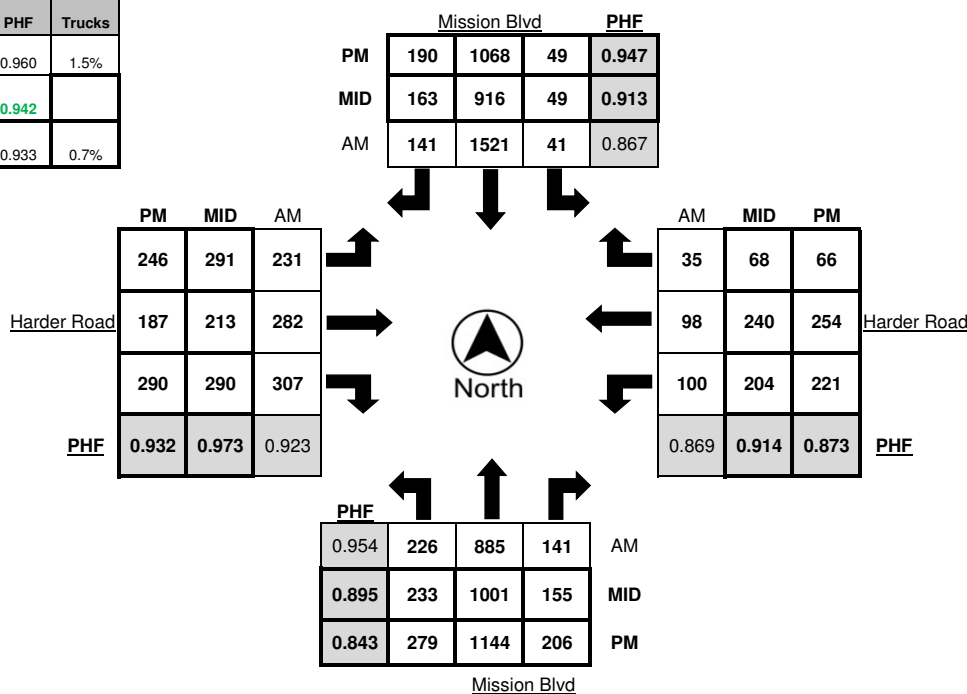
	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	20	200	18	7	7	408	31	9	39	14	33	1	20	19	8	1
7:15 AM - 7:30 AM	28	213	13	8	1	395	36	8	59	24	44	4	23	13	2	1
7:30 AM - 7:45 AM	35	221	34	4	8	450	33	10	54	62	60	1	30	26	5	1
7:45 AM - 8:00 AM	54	225	44	6	13	386	33	5	53	92	77	1	25	31	11	1
8:00 AM - 8:15 AM	72	219	37	2	11	351	37	9	67	69	86	3	27	22	9	2
8:15 AM - 8:30 AM	65	220	26	6	9	334	38	9	57	59	84	1	18	19	10	0
8:30 AM - 8:45 AM	61	243	35	3	10	385	47	12	45	48	51	1	16	5	5	2
8:45 AM - 9:00 AM	43	189	30	7	10	375	41	10	38	61	69	2	21	20	6	1
TOTAL	378	1730	237	43	69	3084	296	72	412	429	504	14	180	155	56	9

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
2:00 PM - 2:15 PM	37	227	32	2	14	172	39	11	41	65	56	1	54	84	22	2
2:15 PM - 2:30 PM	47	267	31	6	7	212	43	12	60	34	71	3	41	55	25	2
2:30 PM - 2:45 PM	55	257	26	10	8	188	34	6	66	31	72	2	45	52	16	1
2:45 PM - 3:00 PM	64	364	36	13	5	194	23	4	61	28	67	2	44	54	11	1
3:00 PM - 3:15 PM	55	232	26	4	7	223	39	7	70	45	89	3	40	52	12	1
3:15 PM - 3:30 PM	61	253	31	5	13	246	50	6	83	44	76	1	53	55	21	1
3:30 PM - 3:45 PM	61	242	40	4	12	222	42	8	74	58	68	1	59	69	12	4
3:45 PM - 4:00 PM	56	274	58	1	17	225	32	6	64	66	57	1	52	64	23	1
TOTAL	436	2116	280	45	83	1682	302	60	519	371	556	14	388	485	142	13
2:15 PM - 3:15 PM	221	1120	119	33	27	817	139	29	257	138	299	10	170	213	64	5
Trucks				2%												

Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	46	262	50	6	8	254	37	10	73	43	67	1	58	56	25	1
4:15 PM - 4:30 PM	61	271	34	12	8	239	51	6	62	44	66	1	52	51	22	2
4:30 PM - 4:45 PM	54	312	46	7	10	244	39	4	68	53	80	4	40	51	14	1
4:45 PM - 5:00 PM	66	314	58	4	8	247	45	7	81	34	79	1	46	44	13	1
5:00 PM - 5:15 PM	66	320	37	6	10	274	46	3	68	35	72	2	55	56	20	0
5:15 PM - 5:30 PM	63	236	30	3	14	283	48	5	62	59	73	1	73	63	19	0
5:30 PM - 5:45 PM	65	280	49	0	10	266	44	1	54	41	72	0	44	52	15	0
5:45 PM - 6:00 PM	85	308	90	7	15	245	52	0	62	52	73	0	49	83	12	0
TOTAL	506	2303	394	45	83	2052	362	36	530	361	582	10	417	456	140	5

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:30 AM - 8:30 AM	226	885	141	18	41	1521	141	33	231	282	307	6	100	98	35	4
3:00 PM - 4:00 PM	233	1001	155	14	49	916	163	27	291	213	290	6	204	240	68	7
5:00 PM - 6:00 PM	279	1144	206	16	49	1068	190	9	246	187	290	3	221	254	66	0

	PHF	Trucks
AM	0.960	1.5%
MID	0.942	
PM	0.933	0.7%





Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Mission Blvd @ Harder Rd

COUNTY Alameda

COLLECTION DATE Thursday, June 02, 2016

LATITUDE 37.651118°

LONGITUDE -122.067056°

WEATHER Sunny and Clear

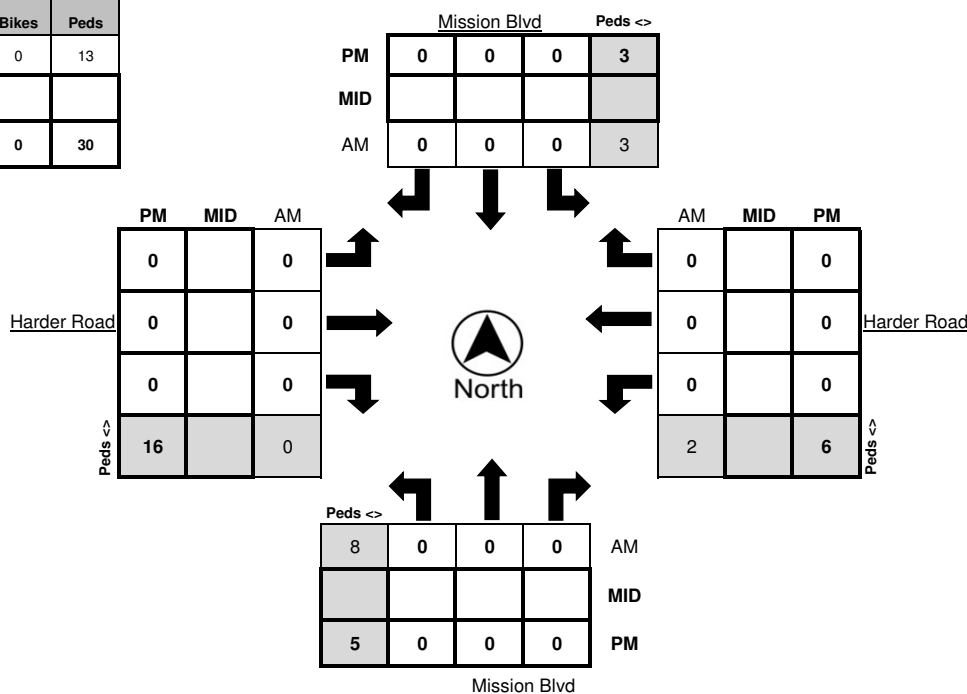
Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:00 AM - 7:15 AM	0	0	0	1	0	0	0	5	0	0	0	1	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	6	0	0	0	1	0	0	0	1
8:30 AM - 8:45 AM	0	0	0	1	0	0	0	6	0	0	0	2	0	0	0	2
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
TOTAL	0	0	0	6	0	0	0	22	0	0	0	6	0	0	0	4

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
2:00 PM - 2:15 PM	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	5
2:15 PM - 2:30 PM	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	5
2:30 PM - 2:45 PM	0	0	0	5	0	0	0	5	0	0	0	4	0	0	0	4
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	2
3:00 PM - 3:15 PM	0	0	0	2	0	0	0	3	0	0	0	3	0	0	0	1
3:15 PM - 3:30 PM	0	0	0	6	0	1	0	3	0	0	0	1	0	0	0	7
3:30 PM - 3:45 PM	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	2
3:45 PM - 4:00 PM	0	0	0	2	0	1	0	3	0	0	0	4	0	0	0	1
TOTAL	0	0	0	32	0	3	0	16	0	0	0	16	0	0	0	27
2:15 PM - 3:15 PM	0	0	0	15	0	0	0	10	0	0	0	10	0	0	0	12

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	2
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM - 5:00 PM	0	0	0	3	0	0	0	3	0	0	0	2	0	0	0	9
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	3	0	0	0	5	0	0	0	6	0	0	0	16

PEAK HOUR	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:30 AM - 8:30 AM	0	0	0	3	0	0	0	8	0	0	0	2	0	0	0	0
5:00 PM - 6:00 PM	0	0	0	3	0	0	0	5	0	0	0	6	0	0	0	16

	Bikes	Peds
AM	0	13
MID		
PM	0	30





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 Hanford, CA 93230
 800-975-6938 Phone/Fax
 www.metrotrafficdata.com

Turning Movement Report

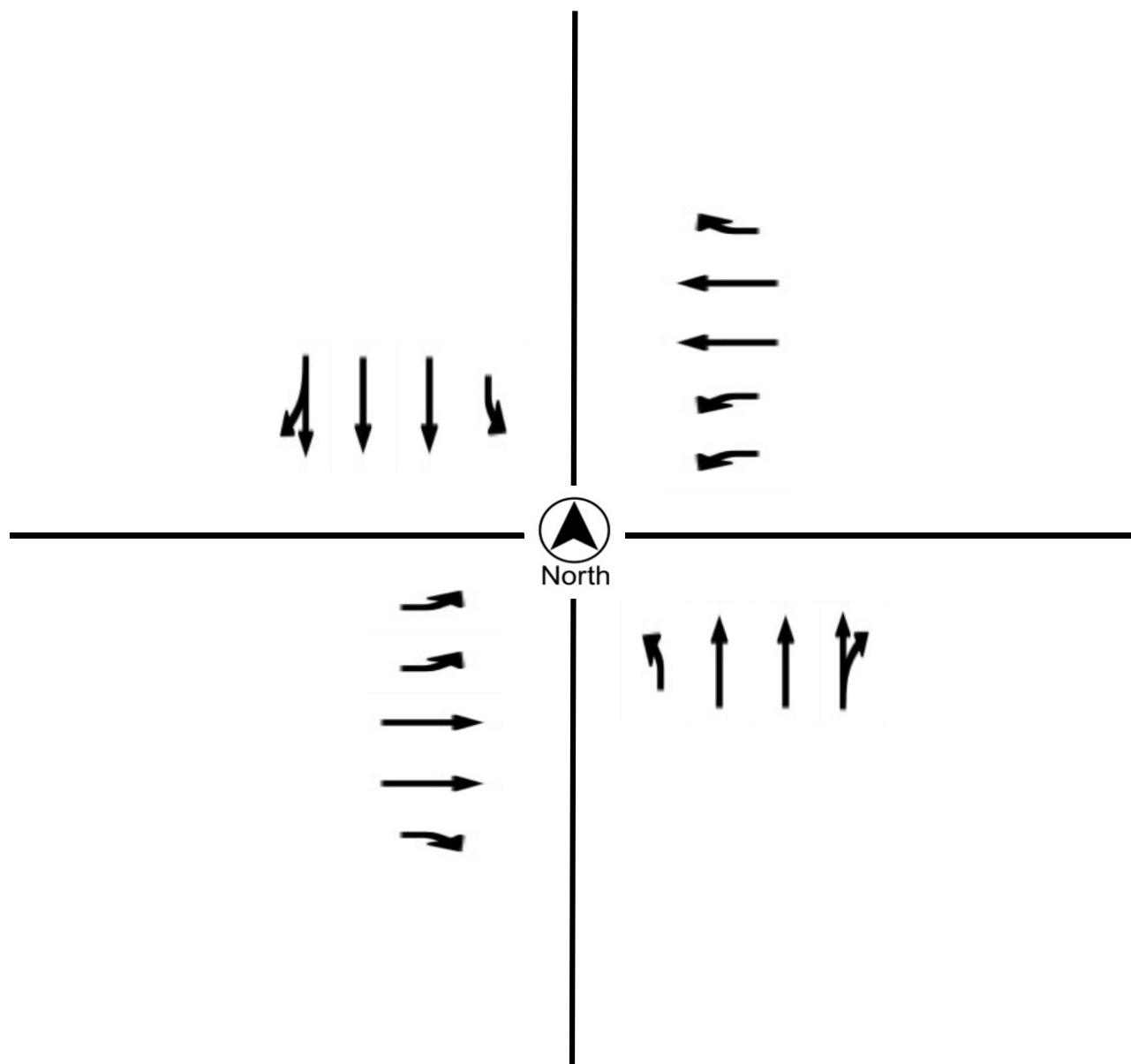
Prepared For:

Kittelson & Associates, Inc.
 155 Grand Avenue, Suite 900
 Oakland, CA 94612

LOCATION Mission Blvd @ Harder Rd
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016
CYCLE TIME 140 Seconds

N/S STREET Mission Blvd
E/W STREET Harder Road
WEATHER Sunny and Clear
CONTROL TYPE Signal

COMMENTS All approaches have protected left turns.

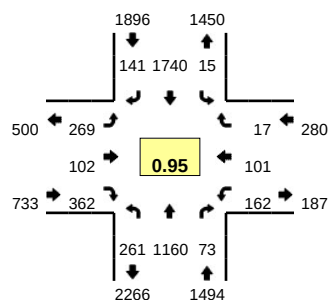


Type of peak hour being reported: Intersection Peak

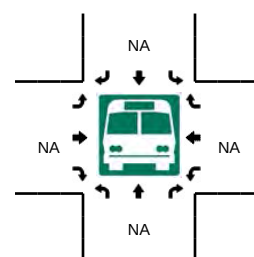
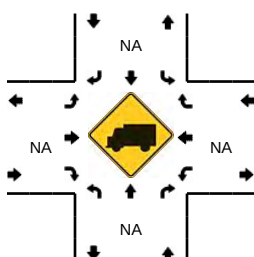
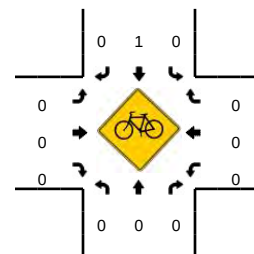
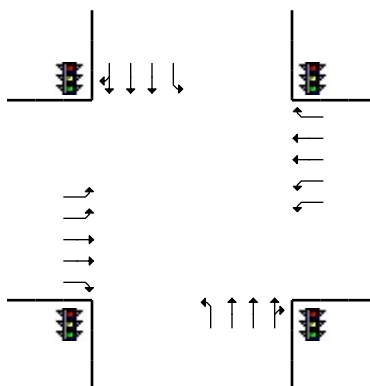
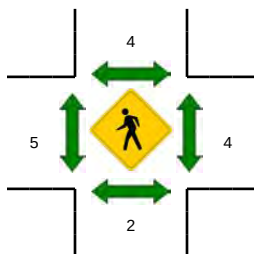
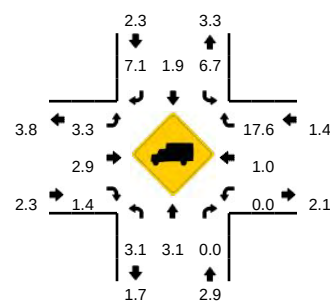
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Harder Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898105
DATE: Thu, Sep 08 2016



Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:55 AM -- 8:10 AM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	12	55	3	0	0	167	11	0	17	6	18	0	9	4	4	0	306	
7:05 AM	11	79	3	1	0	158	12	1	15	4	24	0	6	10	1	0	325	
7:10 AM	14	87	3	0	0	197	6	1	16	7	22	0	6	2	5	0	366	
7:15 AM	17	78	4	0	1	166	9	0	23	5	21	0	15	14	1	0	354	
7:20 AM	7	67	2	0	0	189	16	0	20	9	18	0	14	8	0	0	350	
7:25 AM	18	78	6	0	0	142	16	0	19	8	24	0	18	8	1	0	338	
7:30 AM	14	99	6	0	0	141	12	0	28	7	29	0	16	7	1	0	360	
7:35 AM	28	132	7	2	1	117	5	0	18	5	36	0	11	6	1	0	369	
7:40 AM	24	96	2	0	3	130	9	0	27	6	40	0	14	14	1	0	366	
7:45 AM	27	83	12	0	2	128	15	2	31	6	41	0	25	7	2	1	382	
7:50 AM	28	100	4	0	0	119	9	0	24	12	37	0	18	12	1	0	364	
7:55 AM	32	103	13	1	0	128	15	1	21	18	36	0	9	7	4	0	388	4268
8:00 AM	29	114	11	0	2	126	10	0	26	11	21	0	6	8	0	0	364	4326
8:05 AM	20	123	3	0	2	157	19	0	16	8	37	0	9	8	0	0	402	4403
8:10 AM	28	114	9	1	3	99	15	0	26	10	22	0	6	7	3	0	343	4380
8:15 AM	28	92	3	0	1	119	8	1	34	10	25	0	7	3	2	0	333	4359
8:20 AM	21	99	5	0	2	153	18	0	19	11	34	0	8	6	2	0	378	4387
8:25 AM	11	69	10	0	4	121	15	0	22	7	34	0	8	4	0	0	305	4354
8:30 AM	13	92	8	0	1	139	16	0	22	14	21	0	5	7	3	0	341	4335
8:35 AM	30	88	8	1	3	99	13	0	21	13	22	0	7	8	2	0	315	4281
8:40 AM	22	81	3	0	2	112	12	0	17	1	25	0	6	7	0	0	288	4203
8:45 AM	20	61	5	0	0	134	6	2	25	9	14	0	4	4	1	0	285	4106
8:50 AM	17	93	6	0	0	154	20	0	19	9	23	0	5	0	1	0	347	4089
8:55 AM	19	68	6	0	0	133	18	0	14	6	13	0	1	3	0	0	281	3982
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	324	1360	108	4	16	1644	176	4	252	148	376	0	96	92	16	0	4616	
Heavy Trucks	16	44	0		4	16	16		4	12	0		0	0	0		112	
Pedestrians	4				0				4				0				8	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

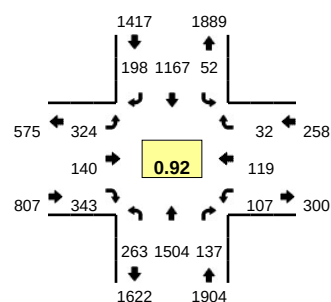
Comments:

Type of peak hour being reported: Intersection Peak

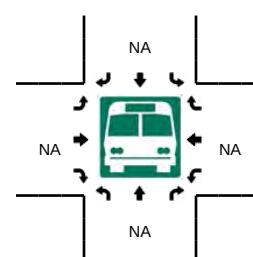
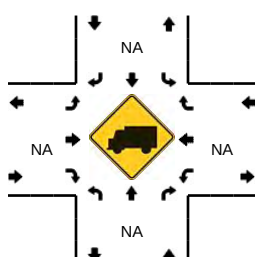
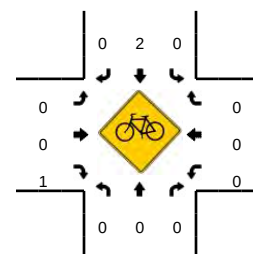
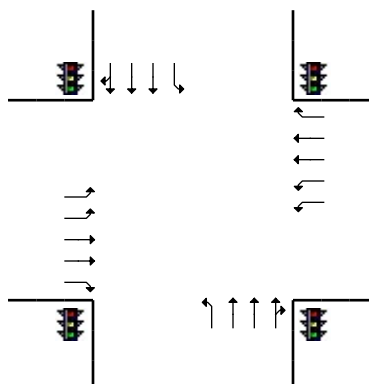
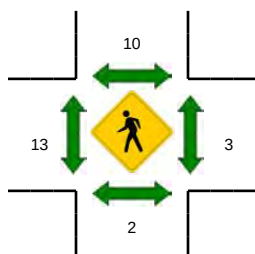
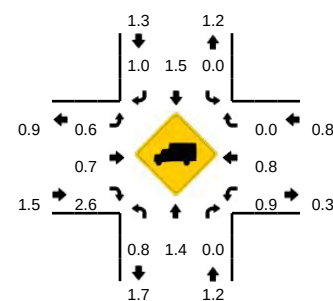
Method for determining peak hour: Total Entering Volume

LOCATION: Mission Blvd -- Harder Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898106
DATE: Thu, Sep 08 2016



Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



5-Min Count Period Beginning At	Mission Blvd (Northbound)				Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	30	137	9	1	3	84	13	1	22	2	23	0	7	15	5	0	352	
4:05 PM	27	122	10	0	1	93	17	3	21	9	35	0	13	17	3	0	371	
4:10 PM	24	109	9	0	1	105	17	3	23	7	23	1	9	10	3	0	344	
4:15 PM	19	125	8	1	2	60	20	3	23	12	35	0	9	16	6	0	339	
4:20 PM	20	142	8	1	1	75	15	3	13	7	21	0	8	7	3	0	324	
4:25 PM	21	152	18	0	2	97	18	1	24	10	34	0	4	7	4	0	392	
4:30 PM	23	102	17	0	3	82	18	2	28	10	26	0	11	9	1	0	332	
4:35 PM	30	94	11	1	0	85	17	5	26	11	23	0	2	5	3	0	313	
4:40 PM	26	143	10	1	3	121	20	2	20	10	30	0	14	14	1	0	415	
4:45 PM	22	140	9	0	1	92	17	2	34	17	37	0	9	12	3	0	395	
4:50 PM	14	99	11	0	3	75	15	3	31	12	32	0	8	13	3	0	319	
4:55 PM	26	114	12	2	1	104	16	0	25	6	41	0	5	9	1	0	362	4258
5:00 PM	13	94	9	0	0	97	17	3	34	10	23	0	10	8	2	0	320	4226
5:05 PM	25	113	8	0	2	67	13	3	27	14	19	0	9	14	5	0	319	4174
5:10 PM	32	143	10	1	3	112	19	2	24	7	25	0	12	9	5	0	404	4234
5:15 PM	18	172	17	0	1	112	26	2	20	5	25	0	13	10	2	0	423	4318
5:20 PM	14	121	12	0	1	107	7	2	30	22	30	0	9	11	2	0	368	4362
5:25 PM	21	125	10	0	3	85	12	3	34	16	23	0	10	3	4	0	349	4319
5:30 PM	27	145	14	0	3	117	19	4	21	8	25	0	2	9	1	0	395	4382
5:35 PM	20	95	15	1	2	78	17	3	24	13	33	0	6	7	3	0	317	4386
5:40 PM	31	142	10	0	0	76	15	2	22	10	24	0	13	6	2	0	353	4324
5:45 PM	30	135	19	0	2	105	16	4	20	9	37	0	4	8	0	0	389	4318
5:50 PM	22	117	13	0	2	111	15	1	25	11	24	0	8	3	1	0	353	4352
5:55 PM	25	102	8	1	3	95	12	7	30	15	26	0	8	7	2	0	341	4331
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	256	1744	156	4	20	1324	208	24	296	136	320	0	136	120	36	0	4780	
Heavy Trucks	0	24	0		0	4	4		4	0	8		0	0	0		44	
Pedestrians		8				8				24				4			44	
Bicycles	0	0	0		0	1	0		0	0	1		0	0	0		2	
Railroad																		
Stopped Buses																		

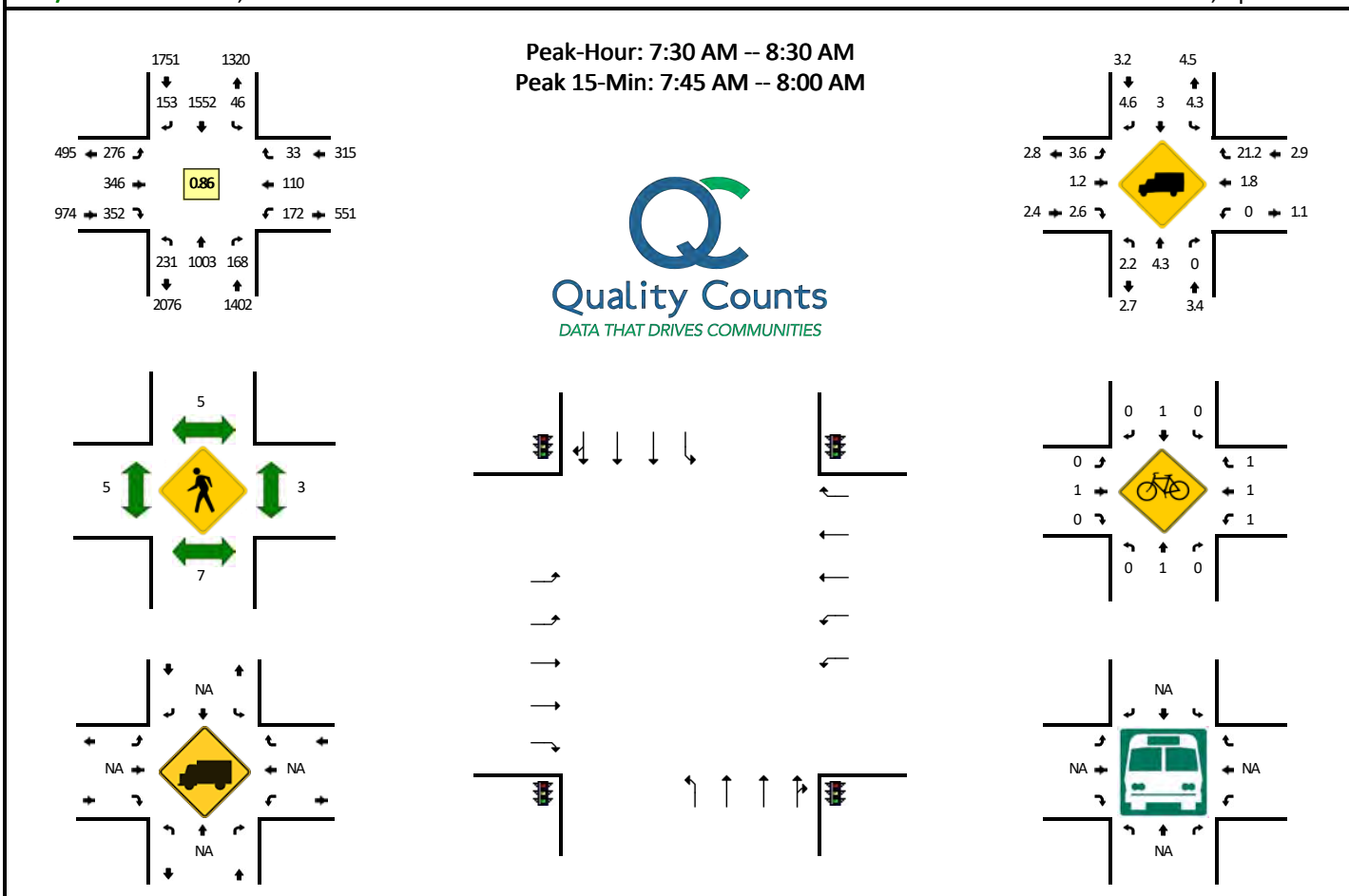
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 4. Mission Blvd -- Harder Rd
CITY/STATE: Alameda, CA

QC JOB #: 14941007
DATE: Wed, Apr 10 2019



5-Min Count Period Beginning At	4. Mission Blvd (Northbound)				4. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	10	55	1	0	0	156	5	0	10	4	21	0	12	8	1	0	283	
7:05 AM	12	75	5	0	1	158	3	0	10	9	11	0	11	4	4	0	303	
7:10 AM	9	60	2	0	0	132	8	2	13	10	21	0	12	6	2	0	277	
7:15 AM	8	79	5	0	0	92	13	0	14	10	14	0	7	6	0	0	248	
7:20 AM	11	65	9	0	2	176	12	0	18	15	17	0	14	4	3	0	346	
7:25 AM	17	73	6	0	0	144	3	0	11	16	19	0	12	6	5	0	312	
7:30 AM	9	89	11	0	3	137	10	1	19	15	28	0	9	3	1	0	335	
7:35 AM	10	78	8	0	2	133	9	1	19	32	23	1	26	7	1	0	350	
7:40 AM	21	77	20	0	4	145	10	0	11	39	21	0	14	12	3	0	377	
7:45 AM	17	98	20	0	3	159	10	1	27	28	36	0	21	9	7	0	436	
7:50 AM	25	89	17	0	2	137	13	0	24	55	49	0	26	12	6	0	455	
7:55 AM	18	92	15	0	4	120	8	0	33	56	33	0	13	12	3	0	407	4129
8:00 AM	30	73	19	0	7	115	19	0	26	22	27	0	21	15	2	0	376	4222
8:05 AM	29	95	12	0	0	115	16	1	18	21	26	0	7	4	1	0	345	4264
8:10 AM	21	64	9	0	2	108	14	0	21	30	32	0	15	14	0	0	330	4317
8:15 AM	24	93	10	0	3	104	12	2	39	17	31	0	9	9	4	0	357	4426
8:20 AM	16	73	9	0	5	135	12	1	16	15	17	0	7	6	1	0	313	4393
8:25 AM	11	82	18	0	2	144	20	2	22	16	29	0	4	7	4	0	361	4442
8:30 AM	11	58	16	1	1	127	20	0	17	23	12	0	8	8	1	0	303	4410
8:35 AM	19	69	11	0	1	125	13	0	15	17	19	0	7	6	1	0	303	4363
8:40 AM	12	57	12	0	4	145	9	0	16	20	12	0	1	5	3	0	296	4282
8:45 AM	11	59	14	1	2	130	13	0	15	21	15	0	2	9	0	0	292	4138
8:50 AM	6	51	16	0	3	127	19	0	16	39	16	0	6	12	3	0	314	3997
8:55 AM	12	60	13	0	2	100	9	1	13	26	19	0	11	6	4	0	276	3866
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	240	1116	208	0	36	1664	124	4	336	556	472	0	240	132	64	0	5192	
Heavy Trucks	4	36	0	0	0	44	0	0	16	0	12	0	0	4	12	0	128	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
Railroad																		
Stopped Buses																		

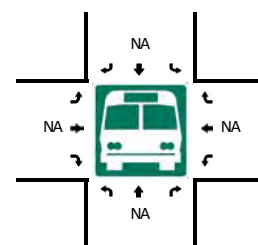
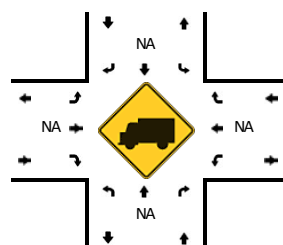
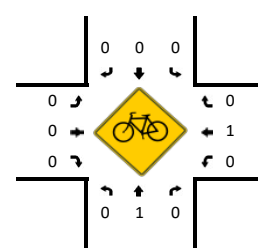
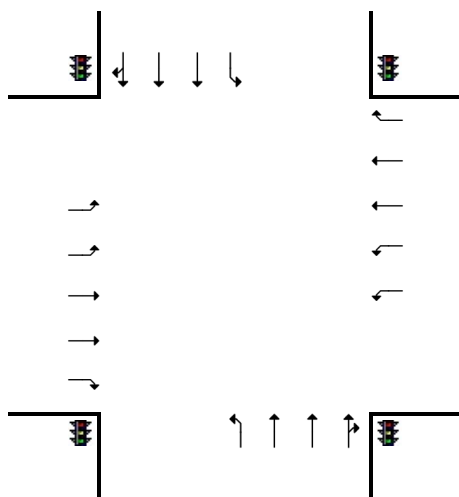
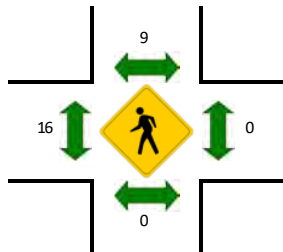
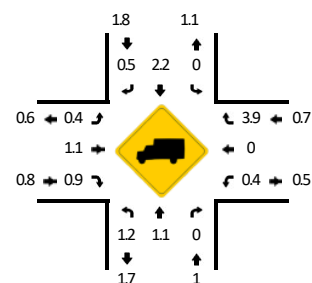
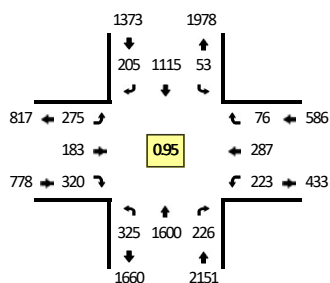
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 4. Mission Blvd -- Harder Rd**QC JOB #:** 14941008**CITY/STATE:** Alameda, CA**DATE:** Wed, Apr 10 2019

Peak-Hour: 4:45 PM -- 5:45 PM
 Peak 15-Min: 4:45 PM -- 5:00 PM



5-Min Count Period Beginning At	4. Mission Blvd (Northbound)				4. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	22	150	14	0	3	70	9	0	25	9	22	0	11	15	8	0	358	
4:05 PM	31	136	10	1	3	64	19	2	19	15	30	0	17	15	9	0	371	
4:10 PM	23	122	15	1	1	95	12	2	24	14	20	0	16	11	6	0	362	
4:15 PM	18	120	21	0	5	97	16	4	25	14	17	1	16	10	3	0	367	
4:20 PM	16	119	18	0	2	84	16	1	33	17	25	0	18	19	9	0	377	
4:25 PM	23	129	13	0	3	101	15	1	21	20	20	0	12	18	5	0	381	
4:30 PM	28	130	18	0	3	83	12	4	22	23	23	0	12	14	8	0	380	
4:35 PM	29	110	18	1	3	95	13	3	25	15	28	0	17	19	8	0	384	
4:40 PM	27	119	20	1	7	89	12	4	19	23	25	0	12	43	6	0	407	
4:45 PM	29	134	27	0	2	89	20	7	16	22	33	0	21	30	10	0	440	
4:50 PM	31	140	19	0	3	80	16	3	24	16	29	0	17	31	4	0	413	
4:55 PM	31	121	21	0	2	98	18	1	24	20	31	0	16	35	9	0	427	4667
5:00 PM	18	147	14	0	0	83	16	1	21	11	28	0	19	35	12	0	405	4714
5:05 PM	26	135	22	0	2	100	15	1	21	10	19	1	24	21	3	0	400	4743
5:10 PM	30	122	18	1	1	89	22	1	27	16	26	0	24	22	8	0	407	4788
5:15 PM	26	143	16	1	3	111	14	5	21	14	30	0	18	20	6	1	429	4850
5:20 PM	20	114	20	0	0	82	11	0	17	13	34	0	23	17	4	0	355	4828
5:25 PM	31	149	19	0	2	110	19	0	21	20	21	1	15	24	5	0	437	4884
5:30 PM	17	109	8	0	2	80	13	3	30	11	30	0	12	15	5	0	335	4839
5:35 PM	27	136	22	1	4	92	22	3	34	13	21	0	20	15	4	0	414	4869
5:40 PM	36	150	20	0	2	101	19	5	16	17	18	1	13	22	6	0	426	4888
5:45 PM	31	146	23	1	4	97	16	2	20	20	20	0	14	12	4	0	410	4858
5:50 PM	16	114	19	0	2	97	9	2	23	16	31	0	16	25	4	0	374	4819
5:55 PM	30	111	24	2	6	94	19	3	23	20	28	0	13	16	4	0	393	4785
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	364	1580	268	0	28	1068	216	44	256	232	372	0	216	384	92	0	5120	
Heavy Trucks	8	24	0		0	16	4		0	0	4		0	0	4		60	
Pedestrians		0				12				28				0			40	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

Report generated on 4/18/2019 2:51 PM

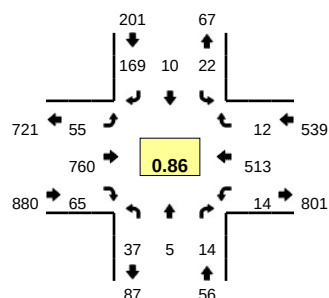
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

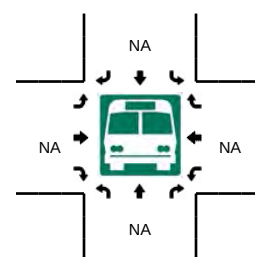
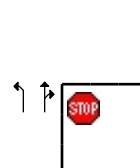
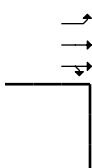
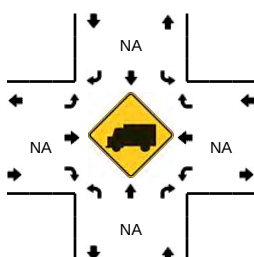
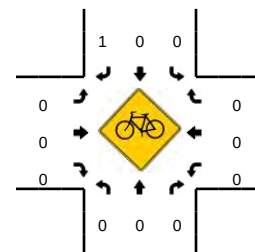
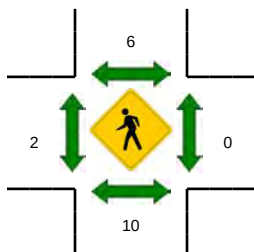
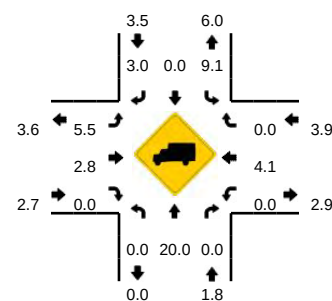
Method for determining peak hour: Total Entering Volume

LOCATION: Dollar St -- Harder Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898113
DATE: Thu, Sep 08 2016



Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



5-Min Count Period Beginning At	Dollar St (Northbound)				Dollar St (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	0	0	0	0	1	10	0	4	40	2	0	0	27	0	0	85	
7:05 AM	1	0	0	0	1	0	7	0	1	45	1	0	0	33	0	0	89	
7:10 AM	2	0	0	0	1	2	11	0	4	52	1	0	0	23	1	0	97	
7:15 AM	3	0	0	0	2	0	11	0	2	37	3	0	0	39	0	1	98	
7:20 AM	5	0	1	0	0	0	10	0	2	45	2	0	0	36	0	0	101	
7:25 AM	0	0	2	0	0	2	10	0	1	50	2	0	0	38	0	2	107	
7:30 AM	3	2	1	0	1	0	9	0	7	64	4	0	2	36	0	0	129	
7:35 AM	2	0	0	0	0	0	8	0	2	70	1	0	0	33	2	0	118	
7:40 AM	3	0	1	0	2	1	10	0	3	68	7	0	3	47	0	0	145	
7:45 AM	2	1	2	3	6	2	20	0	1	73	5	1	0	48	2	0	166	
7:50 AM	2	2	0	0	1	2	12	0	6	66	14	1	1	46	1	0	154	
7:55 AM	7	0	3	0	4	0	17	0	5	72	5	0	1	51	2	0	167	1456
8:00 AM	3	0	0	0	1	3	16	0	3	44	2	0	0	48	1	2	123	1494
8:05 AM	2	0	1	0	5	0	21	0	6	68	7	0	0	45	1	0	156	1561
8:10 AM	3	0	1	0	1	0	14	0	3	66	5	1	0	45	2	0	141	1605
8:15 AM	1	0	2	0	1	0	19	0	5	54	6	2	1	36	0	1	128	1635
8:20 AM	6	0	1	0	0	0	13	0	8	65	7	0	1	40	1	0	142	1676
8:25 AM	1	0	1	0	1	0	11	0	7	55	1	0	1	26	1	1	106	1675
8:30 AM	3	0	2	0	1	2	9	0	5	60	6	0	0	32	3	0	123	1669
8:35 AM	4	1	0	0	0	0	13	0	5	39	6	0	1	50	2	1	122	1673
8:40 AM	6	0	1	0	2	2	12	0	4	47	2	0	4	36	0	2	118	1646
8:45 AM	5	1	3	0	0	0	13	0	4	32	4	0	0	32	1	2	97	1577
8:50 AM	6	0	1	0	3	0	23	0	5	58	1	0	1	25	4	2	129	1552
8:55 AM	3	0	1	0	3	0	9	0	2	22	1	0	0	43	2	0	86	1471
Peak 15-Min Flowrates																		
	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	44	12	20	12	44	16	196	0	48	844	96	8	8	580	20	0	1948	
Heavy Trucks	0	4	0		4	0	12		0	24	0		0	56	0		100	
Pedestrians		8				4				0				0			12	
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

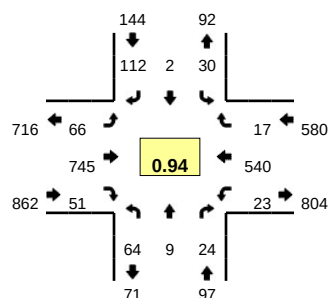
Comments:

Type of peak hour being reported: Intersection Peak

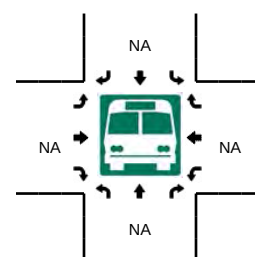
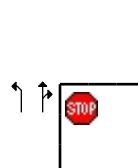
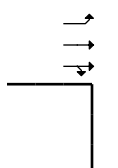
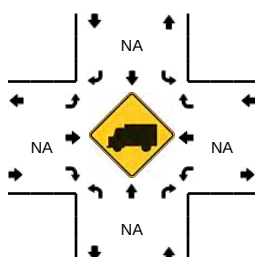
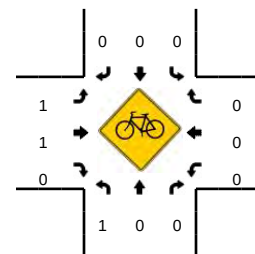
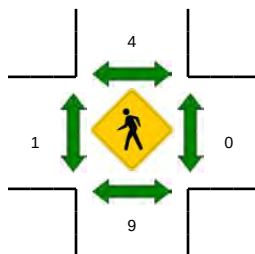
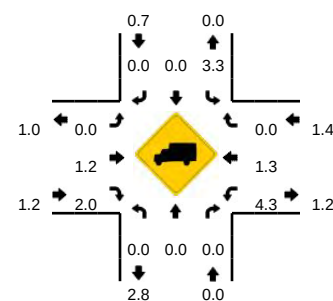
Method for determining peak hour: Total Entering Volume

LOCATION: Dollar St -- Harder Rd
CITY/STATE: Hayward, CA

QC JOB #: 13898114
DATE: Thu, Sep 08 2016



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:40 PM -- 4:55 PM



5-Min Count Period Beginning At	Dollar St (Northbound)				Dollar St (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	0	0	0	0	6	0	5	48	4	0	3	52	4	1	125	
4:05 PM	2	1	5	0	0	0	6	0	6	55	0	0	3	47	1	0	126	
4:10 PM	1	0	0	0	4	0	10	0	5	60	7	0	1	53	2	1	144	
4:15 PM	4	1	1	0	1	0	4	0	8	59	2	0	1	57	0	0	138	
4:20 PM	4	2	2	0	0	0	5	0	3	39	4	0	1	38	1	0	99	
4:25 PM	5	0	2	0	1	0	5	0	5	63	2	0	0	34	2	4	123	
4:30 PM	10	1	1	0	2	1	14	0	7	64	4	0	2	42	0	0	148	
4:35 PM	3	1	2	0	3	1	7	0	6	48	0	0	2	50	3	1	127	
4:40 PM	5	0	0	0	2	0	16	0	5	73	4	0	3	52	0	0	160	
4:45 PM	5	0	0	0	3	0	3	0	2	69	3	0	3	51	0	0	139	
4:50 PM	5	1	1	0	1	0	9	0	13	65	9	0	2	42	0	0	148	
4:55 PM	6	0	5	0	4	0	9	0	3	65	11	0	1	47	2	0	153	1630
5:00 PM	4	1	4	0	3	0	12	0	6	43	3	0	0	35	1	1	113	1618
5:05 PM	2	2	0	0	1	0	9	0	9	77	2	0	2	47	2	1	154	1646
5:10 PM	9	1	3	0	2	0	9	0	2	45	3	0	1	61	2	2	140	1642
5:15 PM	7	1	2	0	1	0	9	0	5	46	3	0	1	43	3	0	121	1625
5:20 PM	4	0	3	0	5	0	10	0	3	84	5	0	1	36	3	0	154	1680
5:25 PM	4	1	3	0	3	0	5	0	5	66	4	0	0	34	1	0	126	1683
5:30 PM	4	0	3	0	2	0	13	0	1	51	2	0	1	50	0	2	129	1664
5:35 PM	5	0	0	0	2	0	12	0	2	51	7	0	0	45	3	1	128	1665
5:40 PM	6	0	1	0	2	0	8	0	2	58	1	0	0	53	2	2	135	1640
5:45 PM	9	0	3	0	2	1	11	0	3	57	8	0	2	42	1	3	142	1643
5:50 PM	3	1	0	0	1	0	5	0	2	71	4	0	1	36	0	1	125	1620
5:55 PM	2	1	5	0	3	0	5	0	3	61	6	0	4	44	3	1	138	1605
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	60	4	4	0	24	0	112	0	80	828	64	0	32	580	0	0	1788	
Heavy Trucks	0	0	0	0	0	0	0	0	0	4	4	0	0	4	0	0	12	
Pedestrians	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230
800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

System Peak

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Harder Road @ Jane Avenue
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016

LATITUDE 37.650355°
LONGITUDE -122.071031°
WEATHER Sunny and Clear

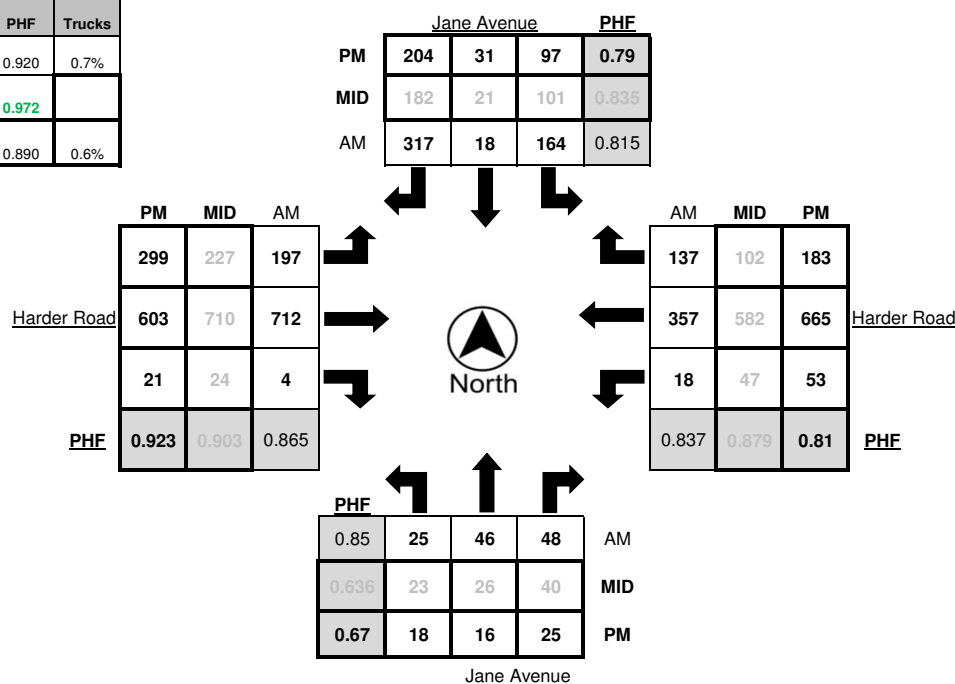
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	4	8	11	0	12	2	37	0	19	75	1	1	0	59	24	1
7:15 AM - 7:30 AM	4	5	10	0	19	2	37	3	26	103	1	4	4	66	21	4
7:30 AM - 7:45 AM	7	15	13	0	27	3	47	0	41	159	0	0	3	79	19	2
7:45 AM - 8:00 AM	5	6	16	0	45	5	78	0	61	201	2	1	4	87	39	2
8:00 AM - 8:15 AM	7	16	11	1	44	7	102	3	37	149	0	0	4	100	49	3
8:15 AM - 8:30 AM	6	9	8	1	48	3	90	1	58	203	2	1	7	91	30	0
8:30 AM - 8:45 AM	6	4	9	0	21	1	36	0	29	139	2	0	7	104	17	6
8:45 AM - 9:00 AM	7	3	7	0	26	21	26	1	22	168	3	1	5	98	17	4
TOTAL	46	66	85	2	242	44	453	8	293	1197	11	8	34	684	216	22

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
2:00 PM - 2:15 PM	0	0	9	1	13	1	28	1	41	167	3	4	7	150	29	4
2:15 PM - 2:30 PM	9	5	6	0	22	4	57	3	54	165	2	5	9	130	25	2
2:30 PM - 2:45 PM	8	3	9	0	16	6	45	1	49	162	2	4	11	104	34	4
2:45 PM - 3:00 PM	4	9	12	0	21	4	66	1	63	151	6	2	15	135	21	2
3:00 PM - 3:15 PM	6	0	9	2	30	10	40	0	58	175	8	5	8	129	27	2
3:15 PM - 3:30 PM	9	14	12	0	20	4	43	0	56	206	4	2	10	155	23	2
3:30 PM - 3:45 PM	4	3	7	0	30	3	33	1	50	178	6	6	14	163	31	4
3:45 PM - 4:00 PM	3	13	5	0	29	8	34	3	50	165	9	5	10	108	32	1
TOTAL	43	47	69	3	181	40	346	10	421	1369	40	33	84	1074	222	21
2:15 PM - 3:15 PM	27	17	36	2	89	24	208	5	224	653	18	16	43	498	107	10
Trucks				2%												

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	5	5	4	0	36	3	43	0	54	197	5	7	7	180	29	4
4:15 PM - 4:30 PM	1	3	3	0	26	9	44	1	50	145	5	3	7	168	32	1
4:30 PM - 4:45 PM	2	6	9	0	33	13	24	1	52	164	5	2	13	144	23	2
4:45 PM - 5:00 PM	6	5	10	0	26	12	41	0	60	155	6	3	8	152	41	1
5:00 PM - 5:15 PM	3	3	9	0	26	5	51	0	66	166	6	2	15	177	39	0
5:15 PM - 5:30 PM	2	5	6	1	22	9	42	0	64	163	10	3	11	162	47	0
5:30 PM - 5:45 PM	3	3	3	0	27	11	67	0	75	120	3	2	7	122	43	0
5:45 PM - 6:00 PM	10	5	7	0	22	6	44	2	94	154	2	2	20	204	54	2
TOTAL	32	35	51	1	218	68	356	4	515	1264	42	24	88	1309	308	10

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:30 AM - 8:30 AM	25	46	48	2	164	18	317	4	197	712	4	2	18	357	137	7
2:45 PM - 3:45 PM	23	26	40	2	101	21	182	2	227	710	24	15	47	582	102	10
5:00 PM - 6:00 PM	18	16	25	1	97	31	204	2	299	603	21	9	53	665	183	2

	PHF	Trucks
AM	0.920	0.7%
MID	0.972	
PM	0.890	0.6%





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Turning Movement Report

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Harder Road @ Jane Avenue

LATITUDE 37.650355°

COUNTY Alameda

LONGITUDE -122.071031°

COLLECTION DATE Thursday, June 02, 2016

WEATHER Sunny and Clear

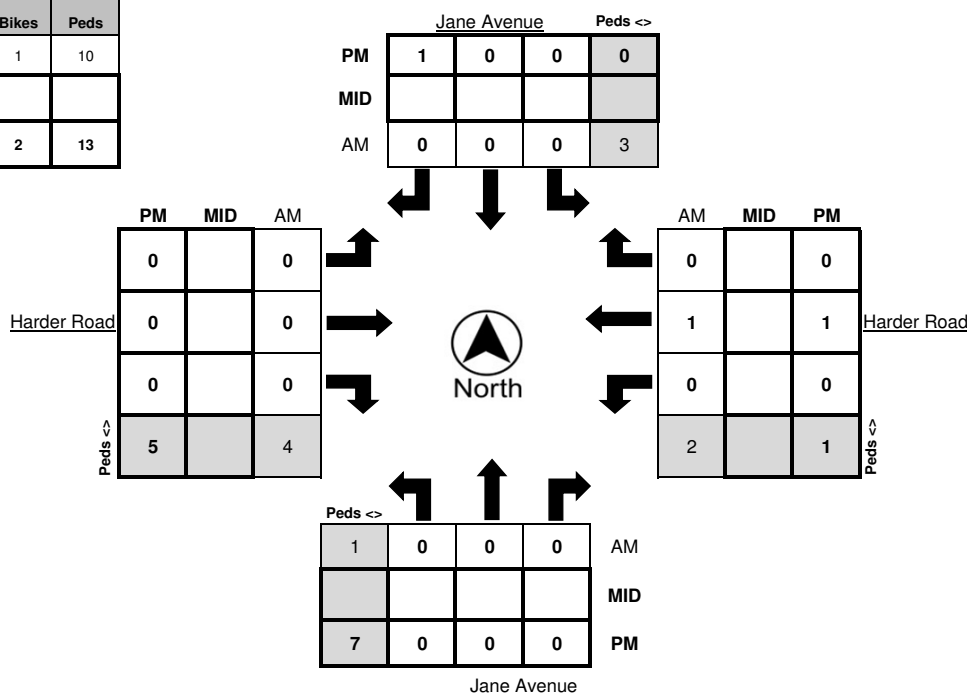
Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:00 AM - 7:15 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
7:15 AM - 7:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	3
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	3
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL	0	0	0	8	0	0	0	4	0	0	0	3	0	2	0	8

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
2:00 PM - 2:15 PM	0	0	0	4	0	0	0	2	0	0	0	1	0	0	0	2
2:15 PM - 2:30 PM	0	0	0	6	0	0	0	1	0	0	0	1	0	0	0	5
2:30 PM - 2:45 PM	0	0	0	3	0	0	0	4	0	0	0	6	0	0	0	2
2:45 PM - 3:00 PM	0	0	1	2	0	1	0	0	0	0	0	1	0	0	0	1
3:00 PM - 3:15 PM	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	4	0	0	0	1	0	0	0	1	0	0	0	2
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
3:45 PM - 4:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	22	1	1	0	10	0	0	0	10	0	0	0	13
2:15 PM - 3:15 PM	0	0	1	13	1	1	0	5	0	0	0	8	0	0	0	8

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	2
4:30 PM - 4:45 PM	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	1	7	0	0	0	1	0	1	0	5

PEAK HOUR	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:30 AM - 8:30 AM	0	0	0	3	0	0	0	1	0	0	0	2	0	1	0	4
2:45 PM - 3:45 PM																
5:00 PM - 6:00 PM	0	0	0	0	0	0	1	7	0	0	0	1	0	1	0	5

	Bikes	Peds
AM	1	10
MID		
PM	2	13





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Turning Movement Report

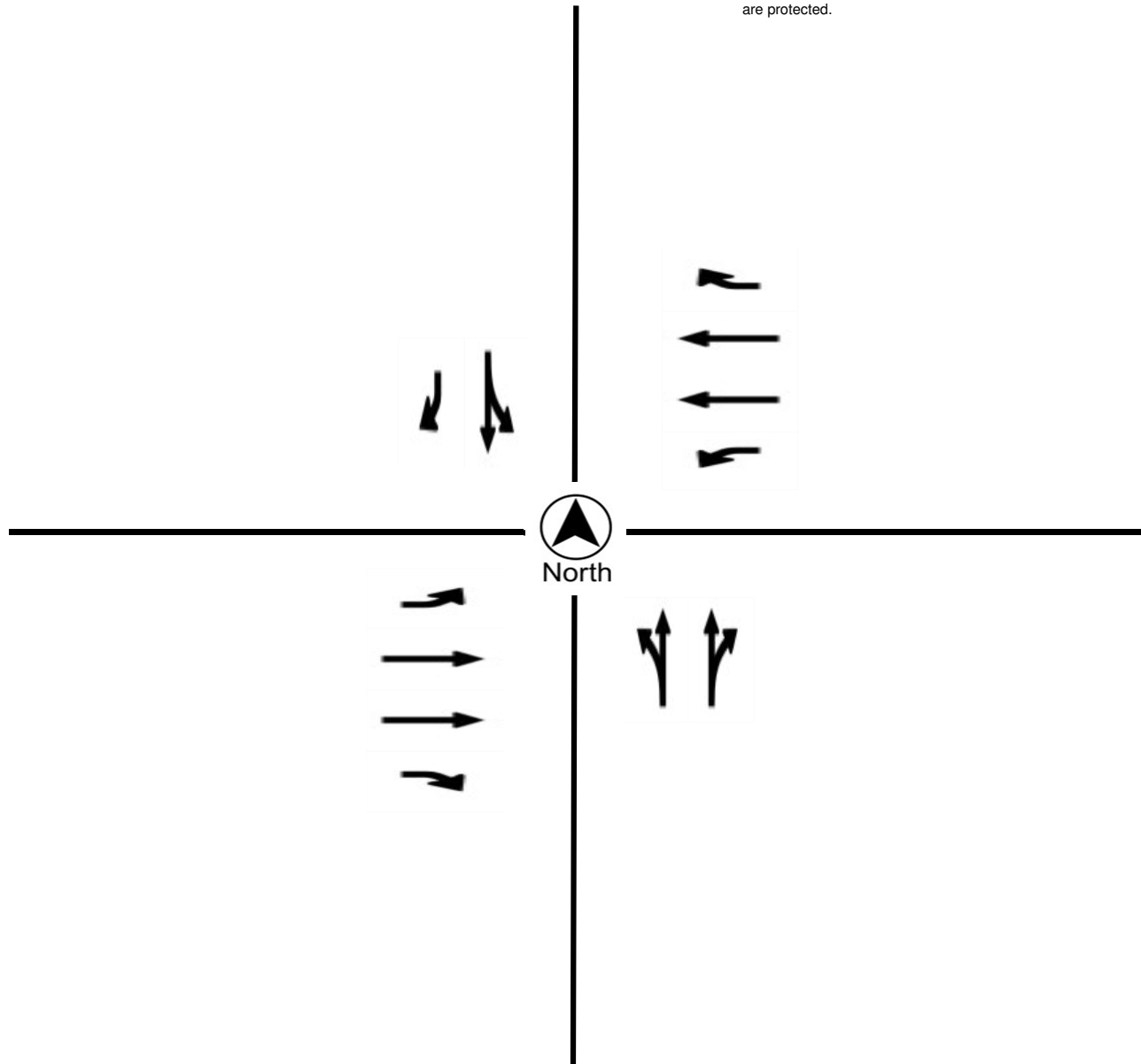
Prepared For:

Kittelson & Associates, Inc.
 155 Grand Avenue, Suite 900
 Oakland, CA 94612

LOCATION Harder Road @ Jane Avenue
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016
CYCLE TIME 111 Seconds

N/S STREET Jane Avenue
E/W STREET Harder Road
WEATHER Sunny and Clear
CONTROL TYPE Signal

COMMENTS Northbound and southbound left turns are permitted. Eastbound and westbound left turns are protected.





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Turning Movement Report

System Peak

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Harder Road @ Soto Road

LATITUDE 37.649377°

COUNTY Alameda

LONGITUDE -122.076821°

COLLECTION DATE Thursday, June 02, 2016

WEATHER Sunny and Clear

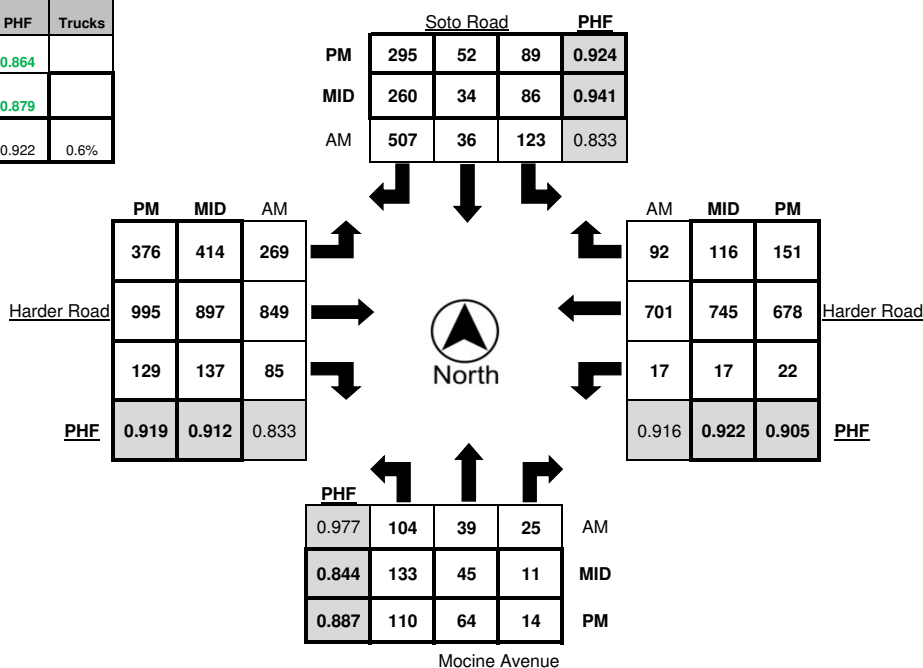
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	20	4	2	1	8	4	98	6	30	88	5	2	2	97	10	4
7:15 AM - 7:30 AM	19	10	9	1	14	3	112	3	38	108	10	6	4	112	5	4
7:30 AM - 7:45 AM	29	8	3	2	20	1	144	3	35	159	8	3	2	137	11	3
7:45 AM - 8:00 AM	30	6	7	1	41	4	142	4	72	216	8	4	0	203	15	3
8:00 AM - 8:15 AM	25	12	6	0	40	9	151	4	65	276	20	9	7	182	28	4
8:15 AM - 8:30 AM	25	10	7	1	26	14	119	7	71	190	31	1	4	185	32	2
8:30 AM - 8:45 AM	24	11	5	0	16	9	95	1	61	167	26	8	6	131	17	9
8:45 AM - 9:00 AM	27	9	3	0	22	5	68	2	50	157	17	7	2	135	12	2
TOTAL	199	70	42	6	187	49	929	30	422	1361	125	40	27	1182	130	31
7:30 AM - 8:30 AM	109	36	23	4	127	28	556	18	243	841	67	17	13	707	86	12
Trucks				2%												

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
2:00 PM - 2:15 PM	34	8	3	0	22	7	43	3	56	159	30	7	0	197	15	3
2:15 PM - 2:30 PM	35	4	4	1	14	12	44	4	61	197	33	9	2	163	19	4
2:30 PM - 2:45 PM	26	7	3	0	17	6	69	4	66	209	29	7	6	166	8	10
2:45 PM - 3:00 PM	27	8	5	0	20	7	60	0	99	211	33	7	3	134	31	6
3:00 PM - 3:15 PM	37	10	3	0	18	15	64	2	105	199	42	7	5	199	34	4
3:15 PM - 3:30 PM	29	8	2	1	21	7	63	1	112	248	37	7	3	183	37	4
3:30 PM - 3:45 PM	33	18	5	2	27	5	69	4	109	213	30	6	4	185	25	5
3:45 PM - 4:00 PM	34	9	1	1	20	7	64	3	88	237	28	8	5	178	20	2
TOTAL	255	72	26	5	159	66	476	21	696	1673	262	58	28	1405	189	38
2:15 PM - 3:15 PM	125	29	15	1	69	40	237	10	331	816	137	30	16	662	92	24
Trucks				3%												

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	21	7	4	0	14	11	73	2	87	254	31	6	2	183	25	3
4:15 PM - 4:30 PM	35	5	7	1	17	7	56	2	83	223	24	3	5	193	27	3
4:30 PM - 4:45 PM	23	8	6	0	17	9	74	3	95	241	26	5	4	136	27	2
4:45 PM - 5:00 PM	25	11	2	1	23	6	54	1	83	238	33	3	2	162	34	1
5:00 PM - 5:15 PM	23	14	3	0	21	10	72	1	97	224	30	4	5	172	43	0
5:15 PM - 5:30 PM	31	14	5	2	22	13	83	1	93	271	28	3	5	182	33	1
5:30 PM - 5:45 PM	25	15	5	0	19	16	69	0	91	230	28	0	2	147	27	0
5:45 PM - 6:00 PM	31	21	1	0	27	13	71	0	95	270	43	6	10	177	48	1
TOTAL	214	95	33	4	160	85	552	10	724	1951	243	30	35	1352	264	11

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:45 AM - 8:45 AM	104	39	25	2	123	36	507	16	269	849	85	22	17	701	92	18
3:00 PM - 4:00 PM	133	45	11	4	86	34	260	10	414	897	137	28	17	745	116	15
5:00 PM - 6:00 PM	110	64	14	2	89	52	295	2	376	995	129	13	22	678	151	2

	PHF	Trucks
AM	0.864	
MID	0.879	
PM	0.922	0.6%





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Turning Movement Report

Prepared For:

Kittelson & Associates, Inc.
155 Grand Avenue, Suite 900
Oakland, CA 94612

LOCATION Harder Road @ Soto Road
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016

LATITUDE 37.649377°
LONGITUDE -122.076821°
WEATHER Sunny and Clear

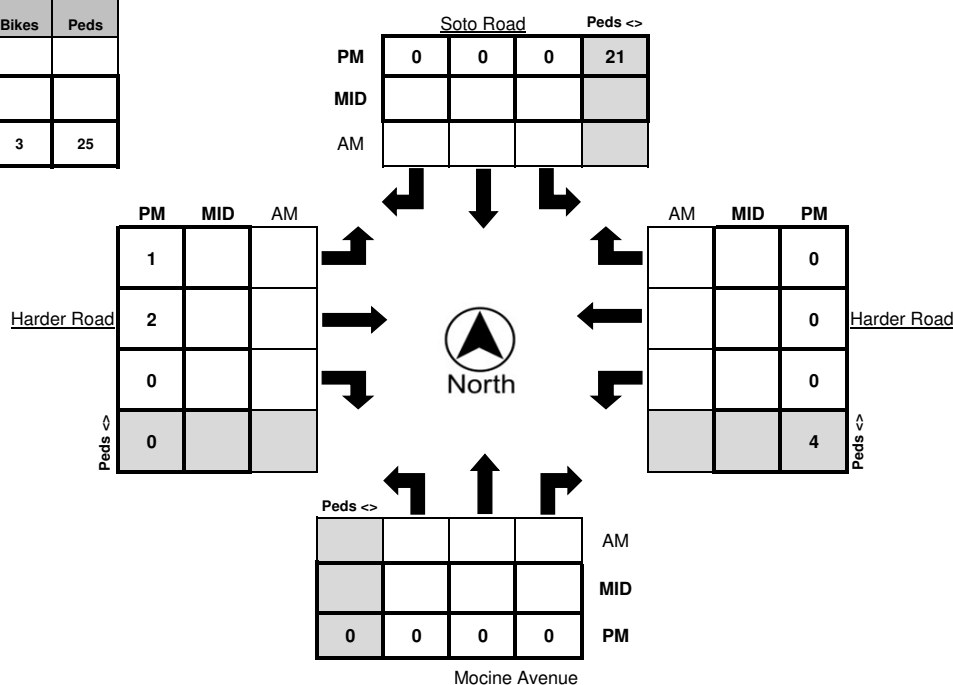
Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	14	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	1	0	0	0	0	0	1	0	2	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	1	0	0	0	0	0	0	0	3	0	1	0	0
TOTAL	0	0	0	41	0	0	0	1	0	2	0	8	0	1	0	0
7:30 AM - 8:30 AM	0	0	0	35	0	0	0	0	0	1	0	3	0	0	0	0

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
2:00 PM - 2:15 PM	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	2
2:15 PM - 2:30 PM	0	0	0	6	0	0	0	0	0	0	0	3	0	0	0	1
2:30 PM - 2:45 PM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1
2:45 PM - 3:00 PM	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	7	0	0	0	0	0	0	0	12	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	2
3:30 PM - 3:45 PM	0	0	0	1	0	0	0	0	1	0	1	2	0	0	0	0
3:45 PM - 4:00 PM	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	4
TOTAL	0	0	0	30	0	2	0	1	1	0	1	24	0	0	0	10
2:15 PM - 3:15 PM	0	0	0	21	0	2	0	0	0	0	0	15	0	0	0	2

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00 PM - 4:15 PM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	4	0	0	0	0	0	1	0	2	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	8	0	0	0	0	1	1	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	21	0	0	0	0	1	2	0	4	0	0	0	0

PEAK HOUR	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:45 AM - 8:45 AM																
3:00 PM - 4:00 PM	0	0	0	16	0	2	0	0	0	0	0	7	0	0	0	4
5:00 PM - 6:00 PM	0	0	0	21	0	0	0	0	1	2	0	4	0	0	0	0

	Bikes	Peds
AM		
MID		
PM	3	25





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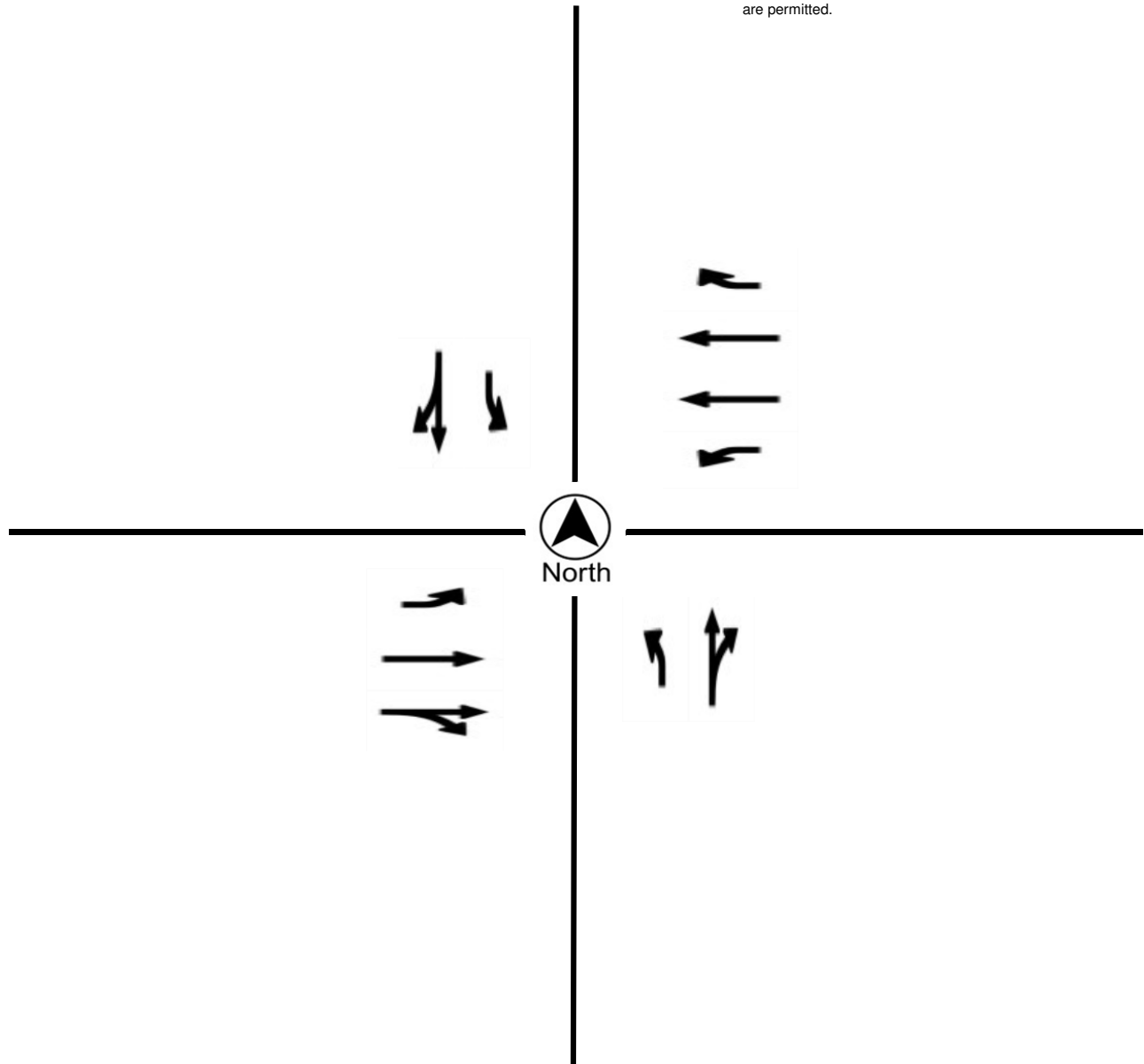
Prepared For:

Kittelson & Associates, Inc.
 155 Grand Avenue, Suite 900
 Oakland, CA 94612

LOCATION Harder Road @ Soto Road
COUNTY Alameda
COLLECTION DATE Thursday, June 02, 2016
CYCLE TIME 108 Seconds

N/S STREET Soto Road
E/W STREET Harder Road
WEATHER Sunny and Clear
CONTROL TYPE Signal

COMMENTS Eastbound and westbound left turns are protected. Northbound and southbound left turns are permitted.



Appendix 2 Existing Level of Service,
Queue, and Peak Hour Traffic
Signal Warrant Worksheets

Level of Service Worksheets

HCM 6th Signalized Intersection Summary

1: Mision Boulevard & Carlos Bee Boulevard

Existing
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	270	69	361	439	276	58	1178	181	422	1519	160
Future Volume (veh/h)	195	270	69	361	439	276	58	1178	181	422	1519	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	212	293	75	392	477	300	63	1280	197	459	1651	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	263	510	128	417	803	356	81	2191	683	491	2692	788
Arrive On Green	0.08	0.18	0.18	0.12	0.22	0.22	0.05	0.44	0.44	0.14	0.53	0.53
Sat Flow, veh/h	3483	2829	712	3483	3582	1587	1781	5025	1567	3483	5066	1483
Grp Volume(v), veh/h	212	184	184	392	477	300	63	1280	197	459	1651	174
Grp Sat Flow(s), veh/h/ln	1742	1791	1750	1742	1791	1587	1781	1675	1567	1742	1689	1483
Q Serve(g_s), s	8.5	13.3	13.7	15.9	16.9	25.7	5.0	27.4	11.5	18.5	32.2	8.8
Cycle Q Clear(g_c), s	8.5	13.3	13.7	15.9	16.9	25.7	5.0	27.4	11.5	18.5	32.2	8.8
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	323	315	417	803	356	81	2191	683	491	2692	788
V/C Ratio(X)	0.81	0.57	0.59	0.94	0.59	0.84	0.78	0.58	0.29	0.94	0.61	0.22
Avail Cap(c_a), veh/h	343	467	456	417	1009	447	251	2191	683	491	2692	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.6	53.2	53.3	62.0	49.3	52.7	67.1	30.3	25.8	60.4	23.1	17.7
Incr Delay (d2), s/veh	10.1	1.6	1.7	29.4	0.7	11.3	14.5	1.1	1.1	25.5	1.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	6.2	6.3	8.7	7.7	11.4	2.6	11.2	4.6	9.9	12.8	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.8	54.8	55.1	91.4	50.0	64.0	81.6	31.4	26.9	85.9	24.2	18.3
LnGrp LOS	E	D	E	F	D	E	F	C	C	F	C	B
Approach Vol, veh/h		580			1169			1540			2284	
Approach Delay, s/veh		62.2			67.5			32.9			36.1	
Approach LOS		E			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.5	80.5	14.7	36.3	24.0	66.9	21.0	30.1				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	20.0	50.5	14.0	40.0	20.0	50.5	17.0	37.0				
Max Q Clear Time (g_c+I1), s	7.0	34.2	10.5	27.7	20.5	29.4	17.9	15.7				
Green Ext Time (p_c), s	0.1	10.9	0.2	3.5	0.0	10.2	0.0	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			44.5									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary

2: Mision Boulevard & Berry Avenue

Existing
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	53	4	35	22	2	6	33	1302	4	39	1855	53
Future Volume (veh/h)	53	4	35	22	2	6	33	1302	4	39	1855	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1811	1841	1841	1900	1856	1856
Adj Flow Rate, veh/h	58	4	38	24	2	7	36	1415	4	42	2016	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	6	4	4	0	3	3
Cap, veh/h	140	18	72	167	18	38	51	2691	8	57	2638	75
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.03	0.75	0.75	0.03	0.75	0.75
Sat Flow, veh/h	801	146	580	991	144	306	1725	3577	10	1810	3497	100
Grp Volume(v), veh/h	100	0	0	33	0	0	36	692	727	42	1010	1064
Grp Sat Flow(s), veh/h/ln	1527	0	0	1440	0	0	1725	1749	1839	1810	1763	1835
Q Serve(g_s), s	5.6	0.0	0.0	0.0	0.0	0.0	2.9	22.9	22.9	3.2	46.5	47.8
Cycle Q Clear(g_c), s	8.3	0.0	0.0	2.7	0.0	0.0	2.9	22.9	22.9	3.2	46.5	47.8
Prop In Lane	0.58		0.38	0.73		0.21	1.00		0.01	1.00		0.05
Lane Grp Cap(c), veh/h	230	0	0	223	0	0	51	1315	1383	57	1329	1384
V/C Ratio(X)	0.44	0.00	0.00	0.15	0.00	0.00	0.71	0.53	0.53	0.74	0.76	0.77
Avail Cap(c_a), veh/h	392	0	0	380	0	0	73	1315	1383	77	1329	1384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.6	0.0	0.0	55.2	0.0	0.0	67.8	7.2	7.2	67.7	10.0	10.1
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.3	0.0	0.0	16.5	1.5	1.4	21.6	4.1	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	1.1	0.0	0.0	1.5	8.1	8.5	1.8	17.0	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.9	0.0	0.0	55.5	0.0	0.0	84.3	8.7	8.6	89.3	14.1	14.3
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	B	B
Approach Vol, veh/h	100			33			1455			2116		
Approach Delay, s/veh	58.9			55.5			10.5			15.7		
Approach LOS	E			E			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	111.3		21.5	8.4	111.1		21.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	6.0	89.0		33.0	6.0	89.0		33.0				
Max Q Clear Time (g_c+14.5), s	49.8			4.7	5.2	24.9		10.3				
Green Ext Time (p_c), s	0.0	25.6		0.1	0.0	14.6		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				15.2								
HCM 6th LOS				B								

HCM 6th TWSC

3: Mision Boulevard & Torrano Avenue (N)

Existing
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↗↗	↗↗	
Traffic Vol, veh/h	0	22	0	1357	1771	122
Future Vol, veh/h	0	22	0	1357	1771	122
Conflicting Peds, #/hr	0	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	4	3	3
Mvmt Flow	0	24	0	1459	1904	131
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	- 1020	-	0	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	- 6.9	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	- 3.3	-	-	-	-	-
Pot Cap-1 Maneuver	0 238	0	-	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	- 238	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	21.8	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	238	-	-		
HCM Lane V/C Ratio	-	0.099	-	-		
HCM Control Delay (s)	-	21.8	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.3	-	-		

HCM 6th TWSC

4: Mision Boulevard & Torrano Avenue (S)

Existing
Timing Plan: AM

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	9	0	30	11	1309	16	37	1755	2
Future Vol, veh/h	0	0	0	9	0	30	11	1309	16	37	1755	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	0	10	0	32	12	1408	17	40	1887	2

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	2740	3449	981	2489	3442	745	1911	0	0	1435	0	0
Stage 1	1990	1990	-	1451	1451	-	-	-	-	-	-	-
Stage 2	750	1459	-	1038	1991	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	10	7	252	15	7	361	315	-	-	479	-	-
Stage 1	64	107	-	140	197	-	-	-	-	-	-	-
Stage 2	374	196	-	251	107	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	8	6	243	13	6	350	308	-	-	474	-	-
Mov Cap-2 Maneuver	8	6	-	13	6	-	-	-	-	-	-	-
Stage 1	60	96	-	133	187	-	-	-	-	-	-	-
Stage 2	319	186	-	227	96	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	209.5	0.1	0.3
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	308	-	-	- 50	474	-	-
HCM Lane V/C Ratio	0.038	-	-	- 0.839	0.084	-	-
HCM Control Delay (s)	17.2	-	-	0 209.5	13.3	-	-
HCM Lane LOS	C	-	-	A F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	- 3.5	0.3	-	-

HCM 6th Signalized Intersection Summary

5: Mision Boulevard & Tennyson Road

Existing
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	333	4	251	8	6	2	198	1300	0	9	1674	242
Future Volume (veh/h)	333	4	251	8	6	2	198	1300	0	9	1674	242
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	374	4	282	9	7	2	222	1461	0	10	1881	272
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	691	374	317	22	17	35	154	3222	0	25	3066	952
Arrive On Green	0.20	0.20	0.20	0.02	0.02	0.02	0.04	0.63	0.00	0.01	0.60	0.60
Sat Flow, veh/h	3456	1870	1585	1023	796	1585	3456	5274	0	1781	5106	1585
Grp Volume(v), veh/h	374	4	282	16	0	2	222	1461	0	10	1881	272
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1819	0	1585	1728	1702	0	1781	1702	1585
Q Serve(g_s), s	13.1	0.2	23.4	1.2	0.0	0.2	6.0	20.0	0.0	0.8	31.5	11.2
Cycle Q Clear(g_c), s	13.1	0.2	23.4	1.2	0.0	0.2	6.0	20.0	0.0	0.8	31.5	11.2
Prop In Lane	1.00		1.00	0.56		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	691	374	317	40	0	35	154	3222	0	25	3066	952
V/C Ratio(X)	0.54	0.01	0.89	0.40	0.00	0.06	1.45	0.45	0.00	0.40	0.61	0.29
Avail Cap(c_a), veh/h	845	457	387	445	0	387	154	3222	0	79	3066	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	43.3	52.5	65.2	0.0	64.7	64.5	12.9	0.0	66.0	17.1	13.0
Incr Delay (d2), s/veh	0.7	0.0	19.0	6.5	0.0	0.7	233.1	0.5	0.0	10.3	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.1	11.0	0.6	0.0	0.1	7.6	7.3	0.0	0.4	12.1	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.1	43.3	71.5	71.6	0.0	65.4	297.6	13.3	0.0	76.3	18.0	13.8
LnGrp LOS	D	D	E	E	A	E	F	B	A	E	B	B
Approach Vol, veh/h	660			18			1683			2163		
Approach Delay, s/veh	58.6			70.9			50.8			17.7		
Approach LOS	E			E			D			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	10.0	86.1	6.9		5.9	90.2	32.0					
Change Period (Y+Rc), s	4.0	5.0	4.0		4.0	5.0	5.0					
Max Green Setting (Gmax), s	6.0	45.0	33.0		6.0	45.0	33.0					
Max Q Clear Time (g_c+I1), s	8.0	33.5	3.2		2.8	22.0	25.4					
Green Ext Time (p_c), s	0.0	9.3	0.0		0.0	11.0	1.6					
Intersection Summary												
HCM 6th Ctrl Delay	36.2											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

6: Mision Boulevard & Harder Road

Existing
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	350	356	174	112	34	234	1014	170	47	1568	155
Future Volume (veh/h)	279	350	356	174	112	34	234	1014	170	47	1568	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1885	1856	1900	1870	1589	1870	1841	1841	1841	1856	1856
Adj Flow Rate, veh/h	324	407	414	202	130	40	272	1179	198	55	1823	180
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	4	1	3	0	2	21	2	4	4	4	3	3
Cap, veh/h	764	928	399	227	352	129	295	1490	250	367	1818	179
Arrive On Green	0.22	0.26	0.26	0.06	0.10	0.10	0.17	0.34	0.34	0.21	0.39	0.39
Sat Flow, veh/h	3401	3582	1540	3510	3554	1299	1781	4320	725	1753	4681	460
Grp Volume(v), veh/h	324	407	414	202	130	40	272	914	463	55	1313	690
Grp Sat Flow(s),veh/h/ln	1700	1791	1540	1755	1777	1299	1781	1675	1695	1753	1689	1764
Q Serve(g_s), s	11.3	13.2	36.0	7.9	4.8	4.0	20.9	34.2	34.2	3.6	54.0	54.0
Cycle Q Clear(g_c), s	11.3	13.2	36.0	7.9	4.8	4.0	20.9	34.2	34.2	3.6	54.0	54.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.43	1.00		0.26
Lane Grp Cap(c), veh/h	764	928	399	227	352	129	295	1155	585	367	1312	685
V/C Ratio(X)	0.42	0.44	1.04	0.89	0.37	0.31	0.92	0.79	0.79	0.15	1.00	1.01
Avail Cap(c_a), veh/h	764	928	399	227	818	299	295	1639	829	367	1312	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	43.1	51.5	64.5	58.5	58.2	57.1	41.0	41.0	44.9	42.5	42.5
Incr Delay (d2), s/veh	0.4	0.3	55.3	31.9	0.6	1.4	32.9	5.6	10.5	0.2	25.0	36.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	5.9	19.8	4.5	2.2	1.4	12.0	14.8	15.8	1.6	26.5	29.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.6	43.4	106.8	96.4	59.2	59.5	90.1	46.6	51.6	45.1	67.5	78.7
LnGrp LOS	D	D	F	F	E	E	F	D	D	D	F	F
Approach Vol, veh/h	1145			372			1649			2058		
Approach Delay, s/veh	67.2			79.4			55.2			70.7		
Approach LOS	E			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	59.0	35.2	17.8	33.1	52.9	13.0	40.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	28.0	54.0	13.0	32.0	9.0	68.0	9.0	36.0				
Max Q Clear Time (g_c+Q), s	22.9	56.0	13.3	6.8	5.6	36.2	9.9	38.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	11.7	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	65.6
HCM 6th LOS	E

HCM 6th TWSC

7: Dollar Street & Harder Road

Existing
Timing Plan: AM

Intersection												
Int Delay, s/veh	10.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	811	70	15	548	13	40	6	15	24	11	181
Future Vol, veh/h	59	811	70	15	548	13	40	6	15	24	11	181
Conflicting Peds, #/hr	6	0	10	10	0	6	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	6	3	0	0	4	0	0	20	0	9	0	3
Mvmt Flow	69	943	81	17	637	15	47	7	17	28	13	210
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	658	0	0	1034	0	0	1493	1824	522	1298	1857	334
Stage 1	-	-	-	-	-	-	1132	1132	-	685	685	-
Stage 2	-	-	-	-	-	-	361	692	-	613	1172	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.5	6.9	6.9	7.68	6.5	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.5	4.2	3.3	3.59	4	3.33
Pot Cap-1 Maneuver	899	-	-	680	-	-	87	63	505	112	74	659
Stage 1	-	-	-	-	-	-	220	242	-	388	451	-
Stage 2	-	-	-	-	-	-	636	402	-	430	269	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	894	-	-	674	-	-	~ 46	56	500	90	66	654
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	56	-	90	66	-
Stage 1	-	-	-	-	-	-	201	221	-	356	437	-
Stage 2	-	-	-	-	-	-	407	390	-	371	246	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.3			191.3			26.3		
HCM LOS							F			D		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	46	153	894	-	-	674	-	-	90	433		
HCM Lane V/C Ratio	1.011	0.16	0.077	-	-	0.026	-	-	0.31	0.516		
HCM Control Delay (s)	274.5	32.9	9.4	-	-	10.5	-	-	62	21.8		
HCM Lane LOS	F	D	A	-	-	B	-	-	F	C		
HCM 95th %tile Q(veh)	4.2	0.6	0.2	-	-	0.1	-	-	1.2	2.9		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 6th Signalized Intersection Summary

8: Jane Avenue & Harder Road

Existing
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (veh/h)	210	760	4	19	623	146	27	49	51	175	19	338
Future Volume (veh/h)	210	760	4	19	623	146	27	49	51	175	19	338
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	228	826	4	21	677	159	29	53	55	190	21	367
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	255	2136	950	31	1688	742	108	217	263	332	30	427
Arrive On Green	0.28	1.00	1.00	0.02	0.47	0.47	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	3582	1594	1795	3582	1575	211	810	979	1005	111	1590
Grp Volume(v), veh/h	228	826	4	21	677	159	51	0	86	211	0	367
Grp Sat Flow(s),veh/h/ln	1795	1791	1594	1795	1791	1575	465	0	1534	1117	0	1590
Q Serve(g_s), s	13.4	0.0	0.0	1.3	13.6	6.5	1.9	0.0	4.8	16.0	0.0	24.1
Cycle Q Clear(g_c), s	13.4	0.0	0.0	1.3	13.6	6.5	22.7	0.0	4.8	20.8	0.0	24.1
Prop In Lane	1.00		1.00	1.00		1.00	0.57		0.64	0.90		1.00
Lane Grp Cap(c), veh/h	255	2136	950	31	1688	742	176	0	412	362	0	427
V/C Ratio(X)	0.89	0.39	0.00	0.68	0.40	0.21	0.29	0.00	0.21	0.58	0.00	0.86
Avail Cap(c_a), veh/h	326	2136	950	196	1688	742	296	0	558	489	0	578
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.77	0.77	0.77	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	0.0	53.8	19.0	17.1	36.9	0.0	31.2	39.3	0.0	38.3
Incr Delay (d2), s/veh	17.5	0.4	0.0	23.0	0.7	0.7	0.9	0.0	0.2	1.5	0.0	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.1	0.0	0.8	5.6	2.4	1.4	0.0	1.8	5.4	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.0	0.4	0.0	76.7	19.7	17.8	37.8	0.0	31.4	40.8	0.0	47.9
LnGrp LOS	E	A	A	E	B	B	D	A	C	D	A	D
Approach Vol, veh/h		1058			857			137			578	
Approach Delay, s/veh		12.4			20.7			33.8			45.3	
Approach LOS		B			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	70.6		33.5	19.6	56.8		33.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	20.0	37.0		40.0				
Max Q Clear Time (g_c+I1), s	3.3	2.0		26.1	15.4	15.6		24.7				
Green Ext Time (p_c), s	0.0	6.7		2.4	0.3	5.1		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				23.4								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Existing
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	259	897	71	14	754	92	116	38	25	135	30	593
Future Volume (veh/h)	259	897	71	14	754	92	116	38	25	135	30	593
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	1043	83	16	877	107	135	44	29	157	35	690
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1679	134	38	1206	510	65	363	239	485	27	524
Arrive On Green	0.19	0.51	0.51	0.03	0.45	0.45	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	3318	264	1781	3554	1503	729	1051	693	1324	77	1516
Grp Volume(v), veh/h	301	558	568	16	877	107	135	0	73	157	0	725
Grp Sat Flow(s), veh/h/ln	1781	1777	1805	1781	1777	1503	729	0	1744	1324	0	1593
Q Serve(g_s), s	18.2	24.9	24.9	1.0	22.2	4.7	0.0	0.0	3.1	10.1	0.0	38.0
Cycle Q Clear(g_c), s	18.2	24.9	24.9	1.0	22.2	4.7	38.0	0.0	3.1	13.3	0.0	38.0
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.40	1.00		0.95
Lane Grp Cap(c), veh/h	335	899	914	38	1206	510	65	0	602	485	0	550
V/C Ratio(X)	0.90	0.62	0.62	0.43	0.73	0.21	2.06	0.00	0.12	0.32	0.00	1.32
Avail Cap(c_a), veh/h	437	899	914	194	1206	510	65	0	602	485	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.6	19.6	19.6	52.8	26.0	21.2	55.0	0.0	24.6	29.1	0.0	36.0
Incr Delay (d2), s/veh	17.7	3.2	3.2	6.7	3.4	0.8	526.6	0.0	0.1	0.4	0.0	155.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	10.6	10.7	0.5	8.8	1.7	11.4	0.0	1.3	3.3	0.0	38.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	22.8	22.7	59.5	29.5	22.1	581.6	0.0	24.7	29.5	0.0	191.4
LnGrp LOS	E	C	C	E	C	C	F	A	C	C	A	F
Approach Vol, veh/h	1427			1000			208			882		
Approach Delay, s/veh	30.9			29.2			386.1			162.6		
Approach LOS	C			C			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	60.7			43.0	24.7	42.3		43.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0			38.0	27.0	31.0		38.0				
Max Q Clear Time (g_c+13), s	26.9			40.0	20.2	24.2		40.0				
Green Ext Time (p_c), s	0.0	7.3		0.0	0.5	3.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	84.4											
HCM 6th LOS	F											

HCM 6th TWSC

10: Mision Boulevard & North Driveway

Existing
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	0	0	1418	2098	0
Future Vol, veh/h	0	0	0	1418	2098	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	0	0	1649	2440	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1220	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	150	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	150	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	-	-	-		
HCM Lane V/C Ratio	-	-	-	-		
HCM Control Delay (s)	-	0	-	-		
HCM Lane LOS	-	A	-	-		
HCM 95th %tile Q(veh)	-	-	-	-		

HCM 6th TWSC

11: Mision Boulevard & South Driveway

Existing
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1418	2098	0
Future Vol, veh/h	0	0	0	1418	2098	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	0	0	1649	2440	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1220	2440	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	175	196	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	175	196	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	196	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	0	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	-	-	-	

HCM 6th Signalized Intersection Summary

1: Mision Boulevard & Carlos Bee Boulevard

Existing
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	307	45	174	261	331	78	1634	332	362	1285	163
Future Volume (veh/h)	113	307	45	174	261	331	78	1634	332	362	1285	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	123	334	49	189	284	360	85	1776	361	393	1397	177
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	168	707	103	236	877	389	105	2317	723	447	2686	786
Arrive On Green	0.05	0.23	0.23	0.07	0.24	0.24	0.06	0.46	0.46	0.13	0.53	0.53
Sat Flow, veh/h	3483	3135	456	3483	3582	1588	1781	5025	1567	3483	5066	1483
Grp Volume(v), veh/h	123	189	194	189	284	360	85	1776	361	393	1397	177
Grp Sat Flow(s),veh/h/ln	1742	1791	1800	1742	1791	1588	1781	1675	1567	1742	1689	1483
Q Serve(g_s), s	5.2	13.7	13.9	8.0	9.7	33.0	7.0	43.9	24.0	16.5	26.6	9.5
Cycle Q Clear(g_c), s	5.2	13.7	13.9	8.0	9.7	33.0	7.0	43.9	24.0	16.5	26.6	9.5
Prop In Lane	1.00		0.25	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	404	406	236	877	389	105	2317	723	447	2686	786
V/C Ratio(X)	0.73	0.47	0.48	0.80	0.32	0.93	0.81	0.77	0.50	0.88	0.52	0.23
Avail Cap(c_a), veh/h	210	445	447	281	962	426	155	2317	723	538	2686	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.9	50.0	50.1	68.5	46.2	55.0	69.3	33.5	28.1	63.8	22.7	18.7
Incr Delay (d2), s/veh	9.4	0.8	0.9	13.2	0.2	25.1	17.3	2.5	2.5	13.5	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	6.3	6.5	4.0	4.4	16.0	3.7	18.1	9.7	8.1	10.7	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.3	50.8	51.0	81.6	46.4	80.0	86.5	36.0	30.6	77.3	23.4	19.3
LnGrp LOS	E	D	D	F	D	F	F	D	C	E	C	B
Approach Vol, veh/h		506			833			2222			1967	
Approach Delay, s/veh		57.8			68.9			37.0			33.8	
Approach LOS		E			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	84.0	11.2	41.0	23.1	73.7	14.1	38.1				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	13.0	69.5	9.0	40.0	23.0	59.5	12.0	37.0				
Max Q Clear Time (g_c+I1), s	9.0	28.6	7.2	35.0	18.5	45.9	10.0	15.9				
Green Ext Time (p_c), s	0.1	14.8	0.1	1.5	0.6	10.5	0.1	2.3				
Intersection Summary												
HCM 6th Ctrl Delay			42.6									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary

2: Mision Boulevard & Berry Avenue

Existing
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	31	3	21	16	2	7	50	1964	6	61	1419	40
Future Volume (veh/h)	31	3	21	16	2	7	50	1964	6	61	1419	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.97	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	32	3	22	16	2	7	52	2025	6	63	1463	41
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	1	1	0	2	2
Cap, veh/h	83	14	37	96	17	29	67	2957	9	80	2873	80
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.07	1.00	1.00	0.04	0.81	0.81
Sat Flow, veh/h	738	222	603	922	271	464	1781	3663	11	1810	3528	99
Grp Volume(v), veh/h	57	0	0	25	0	0	52	989	1042	63	736	768
Grp Sat Flow(s), veh/h/ln	1564	0	0	1657	0	0	1781	1791	1883	1810	1777	1850
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	5.2	19.7	19.8
Cycle Q Clear(g_c), s	5.2	0.0	0.0	2.0	0.0	0.0	4.3	0.0	0.0	5.2	19.7	19.8
Prop In Lane	0.56		0.39	0.64		0.28	1.00		0.01	1.00		0.05
Lane Grp Cap(c), veh/h	134	0	0	142	0	0	67	1446	1520	80	1447	1506
V/C Ratio(X)	0.43	0.00	0.00	0.18	0.00	0.00	0.78	0.68	0.69	0.78	0.51	0.51
Avail Cap(c_a), veh/h	372	0	0	375	0	0	119	1446	1520	109	1447	1506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.3	0.0	0.0	67.0	0.0	0.0	68.8	0.0	0.0	71.0	4.4	4.4
Incr Delay (d2), s/veh	2.1	0.0	0.0	0.6	0.0	0.0	17.7	2.7	2.5	22.5	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	0.9	0.0	0.0	2.2	1.1	1.1	2.9	6.6	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.5	0.0	0.0	67.5	0.0	0.0	86.5	2.7	2.5	93.4	5.7	5.7
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	A	A
Approach Vol, veh/h		57			25			2083			1567	
Approach Delay, s/veh		70.5			67.5			4.7			9.2	
Approach LOS		E			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	127.1		13.3	10.7	126.1		13.3				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	94.0	94.0		33.0	9.0	95.0		33.0				
Max Q Clear Time (g_c+16, s)	21.8	21.8		4.0	7.2	2.0		7.2				
Green Ext Time (p_c), s	0.0	17.9		0.1	0.0	39.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

HCM 6th TWSC

3: Mision Boulevard & Torrano Avenue (N)

Existing
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	37	0	1992	1418	53
Future Vol, veh/h	0	37	0	1992	1418	53
Conflicting Peds, #/hr	0	8	0	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	2	2
Mvmt Flow	0	39	0	2097	1493	56
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	787	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	339	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	335	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	17.2	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	335	-	-		
HCM Lane V/C Ratio	-	0.116	-	-		
HCM Control Delay (s)	-	17.2	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.4	-	-		

HCM 6th TWSC

4: Mision Boulevard & Torrano Avenue (S)

Existing
Timing Plan: PM

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	9	7	0	21	19	1932	37	76	1375	4
Future Vol, veh/h	2	0	9	7	0	21	19	1932	37	76	1375	4
Conflicting Peds, #/hr	4	0	8	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	0	9	7	0	22	20	2034	39	80	1447	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	2670	3722	734	2986	3705	1041	1451	0	0	2073	0	0
Stage 1	1609	1609	-	2094	2094	-	-	-	-	-	-	-
Stage 2	1061	2113	-	892	1611	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	11	5	367	~ 6	5	230	473	-	-	272	-	-
Stage 1	111	165	-	55	95	-	-	-	-	-	-	-
Stage 2	243	93	-	307	165	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	3	364	~ 4	3	229	473	-	-	272	-	-
Mov Cap-2 Maneuver	7	3	-	~ 4	3	-	-	-	-	-	-	-
Stage 1	106	116	-	53	91	-	-	-	-	-	-	-
Stage 2	209	89	-	209	116	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	152.2		\$ 971.4			0.1			1.2			
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	473	-	-	35	15	272	-	-				
HCM Lane V/C Ratio	0.042	-	-	0.331	1.965	0.294	-	-				
HCM Control Delay (s)	12.9	-	-	152.2	\$ 971.4	23.7	-	-				
HCM Lane LOS	B	-	-	F	F	C	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.1	4.3	1.2	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

HCM 6th Signalized Intersection Summary

5: Mision Boulevard & Tennyson Road

Existing
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	356	5	251	10	18	3	384	1712	2	33	1210	332
Future Volume (veh/h)	356	5	251	10	18	3	384	1712	2	33	1210	332
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	363	5	256	10	18	3	392	1747	2	34	1235	339
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	632	342	290	19	34	46	248	3375	4	53	3058	949
Arrive On Green	0.18	0.18	0.18	0.03	0.03	0.03	0.07	0.64	0.64	0.03	0.60	0.60
Sat Flow, veh/h	3456	1870	1585	656	1181	1585	3456	5267	6	1781	5106	1585
Grp Volume(v), veh/h	363	5	256	28	0	3	392	1129	620	34	1235	339
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1838	0	1585	1728	1702	1869	1781	1702	1585
Q Serve(g_s), s	14.7	0.3	24.1	2.3	0.0	0.3	11.0	27.3	27.3	2.9	19.6	16.7
Cycle Q Clear(g_c), s	14.7	0.3	24.1	2.3	0.0	0.3	11.0	27.3	27.3	2.9	19.6	16.7
Prop In Lane	1.00		1.00	0.36		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	632	342	290	53	0	46	248	2181	1198	53	3058	949
V/C Ratio(X)	0.57	0.01	0.88	0.53	0.00	0.07	1.58	0.52	0.52	0.64	0.40	0.36
Avail Cap(c_a), veh/h	858	465	394	456	0	394	248	2181	1198	128	3058	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	51.2	60.9	73.3	0.0	72.3	71.0	14.8	14.8	73.4	16.2	15.7
Incr Delay (d2), s/veh	0.8	0.0	16.2	8.0	0.0	0.6	278.5	0.9	1.6	11.9	0.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.2	11.1	1.2	0.0	0.1	14.4	10.3	11.6	1.5	7.7	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.9	51.2	77.1	81.3	0.0	72.9	349.5	15.7	16.4	85.3	16.6	16.7
LnGrp LOS	E	D	E	F	A	E	F	B	B	F	B	B
Approach Vol, veh/h	624			31			2141			1608		
Approach Delay, s/veh	65.7			80.5			77.0			18.1		
Approach LOS	E			F			E			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	15.0	96.6	8.4		8.6	103.0	33.0					
Change Period (Y+Rc), s	4.0	5.0	4.0		4.0	5.0	5.0					
Max Green Setting (Gmax), s	11.0	48.0	38.0		11.0	48.0	38.0					
Max Q Clear Time (g_c+I1), s	13.0	21.6	4.3		4.9	29.3	26.1					
Green Ext Time (p_c), s	0.0	11.6	0.1		0.0	11.3	1.9					
Intersection Summary												
HCM 6th Ctrl Delay	53.9											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

6: Mision Boulevard & Harder Road

Existing
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	185	324	226	290	77	329	1616	229	54	1127	208
Future Volume (veh/h)	278	185	324	226	290	77	329	1616	229	54	1127	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1885	1900	1900	1841	1885	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	293	195	341	238	305	81	346	1701	241	57	1186	219
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	0	0	4	1	1	1	0	2	2
Cap, veh/h	590	811	358	287	506	211	499	2033	286	237	1298	240
Arrive On Green	0.17	0.23	0.23	0.08	0.14	0.14	0.28	0.45	0.45	0.17	0.40	0.40
Sat Flow, veh/h	3510	3582	1579	3510	3610	1509	1795	4543	640	1810	4318	797
Grp Volume(v), veh/h	293	195	341	238	305	81	346	1282	660	57	935	470
Grp Sat Flow(s),veh/h/ln	1755	1791	1579	1755	1805	1509	1795	1716	1752	1810	1702	1712
Q Serve(g_s), s	11.4	6.7	32.0	10.0	11.9	7.3	25.9	49.4	50.1	4.1	38.9	39.0
Cycle Q Clear(g_c), s	11.4	6.7	32.0	10.0	11.9	7.3	25.9	49.4	50.1	4.1	38.9	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.47
Lane Grp Cap(c), veh/h	590	811	358	287	506	211	499	1536	784	237	1023	515
V/C Ratio(X)	0.50	0.24	0.95	0.83	0.60	0.38	0.69	0.83	0.84	0.24	0.91	0.91
Avail Cap(c_a), veh/h	590	812	358	351	770	322	499	1716	876	237	1067	536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.6	47.5	57.2	67.9	60.6	58.6	48.4	36.5	36.7	55.5	43.2	43.2
Incr Delay (d2), s/veh	0.6	0.2	35.5	13.0	1.2	1.1	4.1	5.5	10.6	0.5	13.7	23.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	3.0	16.2	5.0	5.5	2.9	12.1	21.5	23.4	1.9	17.3	18.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.3	47.6	92.7	80.9	61.7	59.7	52.6	42.1	47.3	56.0	56.9	66.3
LnGrp LOS	E	D	F	F	E	E	D	D	D	E	E	E
Approach Vol, veh/h	829			624			2288			1462		
Approach Delay, s/veh	69.6			68.8			45.2			59.9		
Approach LOS	E			E			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	45.7	50.1	29.2	25.0	23.6	72.1	16.2	38.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	37.0	47.0	17.0	32.0	9.0	75.0	15.0	34.0				
Max Q Clear Time (g_c+Q), s	47.9	41.0	13.4	13.9	6.1	52.1	12.0	34.0				
Green Ext Time (p_c), s	0.7	4.1	0.4	2.0	0.0	15.1	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	56.0
HCM 6th LOS	E

HCM 6th TWSC

7: Dollar Street & Harder Road

Existing
Timing Plan: PM

Intersection												
Int Delay, s/veh	18.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↱		↰	↱	
Traffic Vol, veh/h	77	867	60	27	629	20	75	11	28	35	3	131
Future Vol, veh/h	77	867	60	27	629	20	75	11	28	35	3	131
Conflicting Peds, #/hr	4	0	9	9	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	2	4	1	0	0	0	0	3	0	0
Mvmt Flow	82	922	64	29	669	21	80	12	30	37	3	139
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	694	0	0	995	0	0	1522	1879	502	1373	1901	350
Stage 1	-	-	-	-	-	-	1127	1127	-	742	742	-
Stage 2	-	-	-	-	-	-	395	752	-	631	1159	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.5	6.5	6.9	7.56	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Follow-up Hdwy	2.2	-	-	2.24	-	-	3.5	4	3.3	3.53	4	3.3
Pot Cap-1 Maneuver	911	-	-	679	-	-	83	72	520	104	70	652
Stage 1	-	-	-	-	-	-	221	282	-	371	425	-
Stage 2	-	-	-	-	-	-	607	421	-	433	272	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	908	-	-	673	-	-	~ 56	62	516	75	60	649
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 56	62	-	75	60	-
Stage 1	-	-	-	-	-	-	199	254	-	336	405	-
Stage 2	-	-	-	-	-	-	452	401	-	354	245	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.4			267.5			30.6		
HCM LOS							F			D		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	56 168		908	-	-	673	-	-	75	532		
HCM Lane V/C Ratio	1.425 0.247		0.09	-	-	0.043	-	-	0.496	0.268		
HCM Control Delay (s)	\$ 389.3 33.3		9.4	-	-	10.6	-	-	93.2	14.2		
HCM Lane LOS	F D		A	-	-	B	-	-	F	B		
HCM 95th %tile Q(veh)	7.2 0.9		0.3	-	-	0.1	-	-	2.1	1.1		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 6th Signalized Intersection Summary8: Jane Avenue & Harder Road

Existing
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	348	702	24	62	774	213	21	19	29	113	36	237
Future Volume (veh/h)	348	702	24	62	774	213	21	19	29	113	36	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	391	789	27	70	870	239	24	21	33	127	40	266
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	2206	978	91	1670	732	140	131	230	268	71	342
Arrive On Green	0.40	1.00	1.00	0.05	0.47	0.47	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1795	3582	1589	1795	3582	1571	381	609	1068	975	331	1586
Grp Volume(v), veh/h	391	789	27	70	870	239	31	0	47	167	0	266
Grp Sat Flow(s),veh/h/ln	1795	1791	1589	1795	1791	1571	544	0	1514	1306	0	1586
Q Serve(g_s), s	22.0	0.0	0.0	4.2	18.8	10.5	1.7	0.0	2.8	11.1	0.0	17.4
Cycle Q Clear(g_c), s	22.0	0.0	0.0	4.2	18.8	10.5	15.6	0.0	2.8	13.9	0.0	17.4
Prop In Lane	1.00		1.00	1.00		1.00	0.77		0.71	0.76		1.00
Lane Grp Cap(c), veh/h	359	2206	978	91	1670	732	175	0	327	339	0	342
V/C Ratio(X)	1.09	0.36	0.03	0.77	0.52	0.33	0.18	0.00	0.14	0.49	0.00	0.78
Avail Cap(c_a), veh/h	359	2206	978	196	1670	732	352	0	551	554	0	577
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	51.6	20.7	18.5	41.6	0.0	34.9	40.3	0.0	40.7
Incr Delay (d2), s/veh	63.6	0.3	0.0	13.0	1.2	1.2	0.5	0.0	0.2	1.1	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.1	0.0	2.2	7.9	4.0	0.8	0.0	1.0	4.3	0.0	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.6	0.3	0.0	64.6	21.9	19.7	42.1	0.0	35.1	41.4	0.0	44.5
LnGrp LOS	F	A	A	E	C	B	D	A	D	D	A	D
Approach Vol, veh/h		1207			1179			78			433	
Approach Delay, s/veh		31.5			24.0			37.9			43.3	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	72.7		27.7	26.0	56.3		27.7				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	22.0	35.0		40.0				
Max Q Clear Time (g_c+I1), s	6.2	2.0		19.4	24.0	20.8		17.6				
Green Ext Time (p_c), s	0.1	6.4		1.9	0.0	5.8		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				30.3								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Existing
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	437	1158	150	26	789	176	128	74	16	104	61	343
Future Volume (veh/h)	437	1158	150	26	789	176	128	74	16	104	61	343
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	475	1259	163	28	858	191	139	80	17	113	66	373
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	473	1631	210	56	1009	433	141	493	105	443	80	453
Arrive On Green	0.26	0.51	0.51	0.03	0.28	0.28	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1795	3173	408	1795	3582	1538	956	1506	320	1305	245	1385
Grp Volume(v), veh/h	475	707	715	28	858	191	139	0	97	113	0	439
Grp Sat Flow(s), veh/h/ln	1795	1791	1791	1795	1791	1538	956	0	1826	1305	0	1630
Q Serve(g_s), s	29.0	34.9	35.5	1.7	24.9	11.2	8.7	0.0	4.2	7.4	0.0	27.3
Cycle Q Clear(g_c), s	29.0	34.9	35.5	1.7	24.9	11.2	36.0	0.0	4.2	11.6	0.0	27.3
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.18	1.00		0.85
Lane Grp Cap(c), veh/h	473	921	921	56	1009	433	141	0	598	443	0	533
V/C Ratio(X)	1.00	0.77	0.78	0.50	0.85	0.44	0.98	0.00	0.16	0.25	0.00	0.82
Avail Cap(c_a), veh/h	473	921	921	229	1009	433	141	0	598	443	0	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.77	0.77	0.77	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.5	21.5	21.6	52.4	37.3	32.4	52.6	0.0	26.3	30.4	0.0	34.1
Incr Delay (d2), s/veh	42.2	6.1	6.4	5.1	7.0	2.5	70.6	0.0	0.1	0.3	0.0	10.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	15.3	15.6	0.8	11.6	4.4	6.6	0.0	1.9	2.4	0.0	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.7	27.6	28.0	57.6	44.3	34.9	123.2	0.0	26.4	30.7	0.0	44.1
LnGrp LOS	F	C	C	E	D	C	F	A	C	C	A	D
Approach Vol, veh/h	1897			1077			236			552		
Approach Delay, s/veh	41.5			43.0			83.4			41.4		
Approach LOS	D			D			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	61.6		41.0	33.0	36.0		41.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0	46.0		36.0	29.0	31.0		36.0				
Max Q Clear Time (g_c+13), s	37.5	37.5		29.3	31.0	26.9		38.0				
Green Ext Time (p_c), s	0.0	5.6		1.9	0.0	2.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	44.6											
HCM 6th LOS	D											

HCM 6th TWSC

10: Mision Boulevard & North Driveway

Existing
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	0	0	2174	1677	0
Future Vol, veh/h	0	0	0	2174	1677	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	0	0	2288	1765	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	883	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	251	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	251	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	-	-	-		
HCM Lane V/C Ratio	-	-	-	-		
HCM Control Delay (s)	-	0	-	-		
HCM Lane LOS	-	A	-	-		
HCM 95th %tile Q(veh)	-	-	-	-		

HCM 6th TWSC

11: Mision Boulevard & South Driveway

Existing
Timing Plan: PM

Intersection

Int Delay, s/veh 0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	2174	1677	0
Future Vol, veh/h	0	0	0	2174	1677	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	0	0	2288	1765	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	883	1765
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	2.2
Pot Cap-1 Maneuver	0	293	358
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	293	358
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	358	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Queue Worksheets

Queues

1: Mision Boulevard & Carlos Bee Boulevard

Existing

Timing Plan: AM



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	212	368	392	477	300	63	1280	197	459	1651	174
v/c Ratio	0.67	0.66	0.89	0.68	0.57	0.49	0.62	0.26	0.77	0.62	0.21
Control Delay	73.4	57.7	84.3	58.1	11.9	75.0	35.1	4.8	64.9	26.2	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	57.7	84.3	58.1	11.9	75.0	35.1	4.8	64.9	26.2	10.0
Queue Length 50th (ft)	98	158	188	219	21	57	341	0	209	392	34
Queue Length 95th (ft)	143	201	#289	264	104	105	430	53	269	520	91
Internal Link Dist (ft)		743		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	341	894	438	1006	639	249	2081	765	600	2677	816
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.41	0.89	0.47	0.47	0.25	0.62	0.26	0.77	0.62	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

2: Mision Boulevard & Berry Avenue

Existing

Timing Plan: AM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	33	36	1419	42	2074
v/c Ratio	0.65	0.24	0.36	0.54	0.38	0.78
Control Delay	67.1	51.4	72.4	8.8	72.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	51.4	72.4	8.8	72.1	14.1
Queue Length 50th (ft)	72	22	32	256	38	537
Queue Length 95th (ft)	130	56	69	402	77	843
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	352	322	103	2652	113	2673
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.10	0.35	0.54	0.37	0.78
Intersection Summary						

Queues

5: Mision Boulevard & Tennyson Road

Existing

Timing Plan: AM



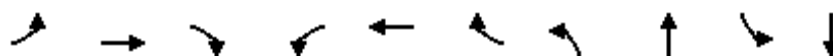
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	374	4	282	16	2	222	1461	10	1881	272
v/c Ratio	0.68	0.01	0.57	0.17	0.01	0.45	0.40	0.12	0.66	0.29
Control Delay	59.2	44.0	10.0	65.1	0.0	57.0	10.2	64.0	23.8	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	44.0	10.0	65.1	0.0	57.0	10.2	64.0	23.8	8.9
Queue Length 50th (ft)	161	3	0	14	0	94	134	9	360	44
Queue Length 95th (ft)	200	13	73	39	0	136	332	28	558	124
Internal Link Dist (ft)		1876		1688			894		973	
Turn Bay Length (ft)	470		225		315	500		240		210
Base Capacity (vph)	839	455	600	442	454	492	3621	86	2830	946
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.01	0.47	0.04	0.00	0.45	0.40	0.12	0.66	0.29
Intersection Summary										

Queues

6: Mision Boulevard & Harder Road

Existing

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	324	407	414	202	130	40	272	1377	55	2003
v/c Ratio	0.48	0.61	0.85	0.66	0.49	0.19	0.94	0.60	0.20	0.92
Control Delay	51.0	54.7	37.7	71.7	67.4	2.1	97.1	30.8	53.1	45.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	54.7	37.7	71.7	67.4	2.1	97.1	30.8	53.1	45.0
Queue Length 50th (ft)	133	181	159	91	60	0	246	373	41	625
Queue Length 95th (ft)	169	203	242	#157	89	0	#387	372	87	#738
Internal Link Dist (ft)		322			2082			357		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	673	925	579	307	814	391	292	2618	271	2178
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.44	0.72	0.66	0.16	0.10	0.93	0.53	0.20	0.92

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

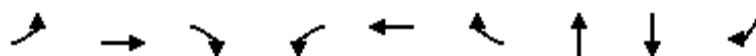
Queue shown is maximum after two cycles.

Queues

8: Jane Avenue & Harder Road

Existing

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	228	826	4	21	677	159	137	211	367
v/c Ratio	0.74	0.36	0.00	0.19	0.40	0.19	0.19	0.75	0.57
Control Delay	59.2	13.1	0.0	52.3	21.9	4.5	18.7	54.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	13.1	0.0	52.3	21.9	4.5	18.7	54.0	6.7
Queue Length 50th (ft)	172	82	0	14	158	0	24	139	0
Queue Length 95th (ft)	252	220	m0	40	264	45	44	198	64
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	343	2291	1019	194	1703	832	1087	442	805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.36	0.00	0.11	0.40	0.19	0.13	0.48	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: Soto Road & Harder Road

Existing

Timing Plan: AM



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	301	1126	16	877	107	135	73	157	725
v/c Ratio	0.82	0.63	0.15	0.80	0.21	2.01	0.11	0.33	0.83
Control Delay	59.3	22.0	43.1	47.1	18.7	526.2	16.5	29.0	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	22.0	43.1	47.1	18.7	526.2	16.5	29.0	20.9
Queue Length 50th (ft)	202	253	11	188	0	~151	21	82	178
Queue Length 95th (ft)	276	377	m25	394	74	#220	50	133	317
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	434	1787	193	1090	520	67	639	469	872
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.63	0.08	0.80	0.21	2.01	0.11	0.33	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

1: Mision Boulevard & Carlos Bee Boulevard

Existing

Timing Plan: PM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	383	189	284	360	85	1776	361	393	1397	177
v/c Ratio	0.61	0.73	0.71	0.47	0.77	0.57	0.70	0.39	0.77	0.49	0.20
Control Delay	81.4	66.8	81.8	57.7	29.3	80.3	31.5	8.4	71.3	20.9	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	66.8	81.8	57.7	29.3	80.3	31.5	8.4	71.3	20.9	5.6
Queue Length 50th (ft)	61	186	93	133	108	81	469	49	191	282	16
Queue Length 95th (ft)	97	226	137	168	217	137	641	148	241	401	65
Internal Link Dist (ft)		496		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	209	863	279	959	600	167	2532	920	559	2878	886
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.44	0.68	0.30	0.60	0.51	0.70	0.39	0.70	0.49	0.20
Intersection Summary											

Queues

2: Mision Boulevard & Berry Avenue

Existing

Timing Plan: PM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	25	52	2031	63	1504
v/c Ratio	0.50	0.27	0.45	0.70	0.49	0.52
Control Delay	61.3	58.5	86.6	23.6	79.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	58.5	86.6	23.6	79.3	6.8
Queue Length 50th (ft)	37	17	46	1032	60	248
Queue Length 95th (ft)	84	49	m70	1071	109	380
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	357	310	129	2907	134	2883
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.08	0.40	0.70	0.47	0.52

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

5: Mision Boulevard & Tennyson Road

Existing

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	363	5	256	28	3	392	1749	34	1235	339
v/c Ratio	0.68	0.02	0.55	0.19	0.01	0.32	0.55	0.35	0.77	0.51
Control Delay	67.0	50.4	10.4	63.7	0.0	40.8	21.4	78.5	51.6	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	50.4	10.4	63.7	0.0	40.8	21.4	78.5	51.6	14.9
Queue Length 50th (ft)	179	4	0	28	0	144	348	33	410	72
Queue Length 95th (ft)	219	17	78	52	0	#276	675	72	469	171
Internal Link Dist (ft)		1876		1698			1191		950	
Turn Bay Length (ft)	470		225		315	500		240		210
Base Capacity (vph)	852	462	585	454	451	1230	3202	128	1595	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.01	0.44	0.06	0.01	0.32	0.55	0.27	0.77	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

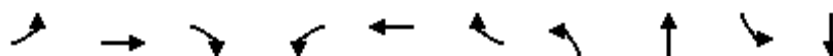
Queue shown is maximum after two cycles.

Queues

6: Mision Boulevard & Harder Road

Existing

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	293	195	341	238	305	81	346	1942	57	1405
v/c Ratio	0.71	0.56	0.74	0.48	0.70	0.29	0.89	0.66	0.40	0.65
Control Delay	72.9	69.9	16.1	62.4	71.8	6.5	81.0	23.8	69.9	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.9	69.9	16.1	62.4	71.8	6.5	81.0	23.8	69.9	31.4
Queue Length 50th (ft)	144	97	0	112	153	0	328	505	54	397
Queue Length 95th (ft)	190	134	99	154	198	26	#449	578	105	520
Internal Link Dist (ft)		322			2082			387		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	436	810	617	494	770	412	440	2944	145	2147
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.24	0.55	0.48	0.40	0.20	0.79	0.66	0.39	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

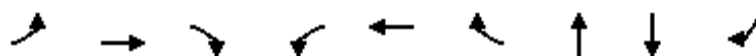
Queue shown is maximum after two cycles.

Queues

8: Jane Avenue & Harder Road

Existing

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	391	789	27	70	870	239	78	167	266
v/c Ratio	0.70	0.35	0.03	0.45	0.62	0.31	0.15	0.70	0.54
Control Delay	46.0	16.6	7.0	56.0	30.2	4.6	22.4	57.3	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	16.6	7.0	56.0	30.2	4.6	22.4	57.3	8.5
Queue Length 50th (ft)	294	158	1	48	249	0	14	113	0
Queue Length 95th (ft)	m386	233	m5	91	361	53	31	167	61
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	559	2277	997	198	1405	766	1051	494	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.35	0.03	0.35	0.62	0.31	0.07	0.34	0.36

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: Soto Road & Harder Road

Existing

Timing Plan: PM



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	475	1422	28	858	191	139	97	113	439
v/c Ratio	0.97	0.77	0.24	0.85	0.34	1.04	0.17	0.27	0.62
Control Delay	74.6	25.7	39.1	60.5	23.6	125.7	24.6	29.8	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.6	25.7	39.1	60.5	23.6	125.7	24.6	29.8	15.3
Queue Length 50th (ft)	~341	442	20	263	34	97	43	58	90
Queue Length 95th (ft)	#554	568	m35	#414	139	#229	83	106	198
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	490	1850	227	1007	556	139	604	425	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.77	0.12	0.85	0.34	1.00	0.16	0.27	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Peak Hour Signal Warrants



KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
EIR\analysis\signal warrants\Mission&Torrano
S\25541_Signal-Warrant_Mission&Torrano S EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Existing AM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
8:00 AM	9:00 AM	1336	1794	0	39
2nd Highest Hour		1265	1698	0	35
3rd Highest Hour		1247	1674	0	30
4th Highest Hour		1193	1603	0	30
5th Highest Hour		1176	1579	0	26
6th Highest Hour		1176	1579	0	26
7th Highest Hour		1122	1507	0	25
8th Highest Hour		1104	1483	0	23
9th Highest Hour		1069	1435	0	22
10th Highest Hour		998	1340	0	21
11th Highest Hour		962	1292	0	21
12th Highest Hour		944	1268	0	21
13th Highest Hour		908	1220	0	20
14th Highest Hour		784	1052	0	17
15th Highest Hour		623	837	0	16
16th Highest Hour		588	789	0	12
17th Highest Hour		410	550	0	12
18th Highest Hour		338	454	0	8
19th Highest Hour		178	239	0	5
20th Highest Hour		125	167	0	4
21st Highest Hour		107	144	0	2
22nd Highest Hour		71	96	0	2
23rd Highest Hour		36	48	0	2
24th Highest Hour		36	48	0	1

Warrant Summary

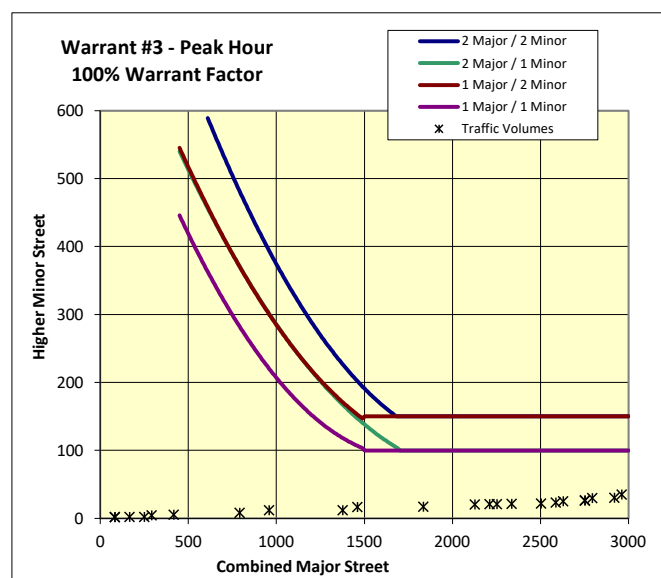
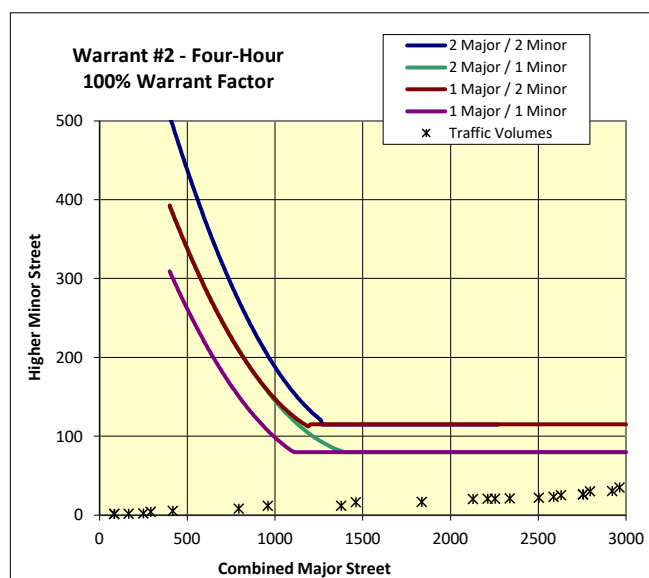
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Mission&Torrano
 S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Existing PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

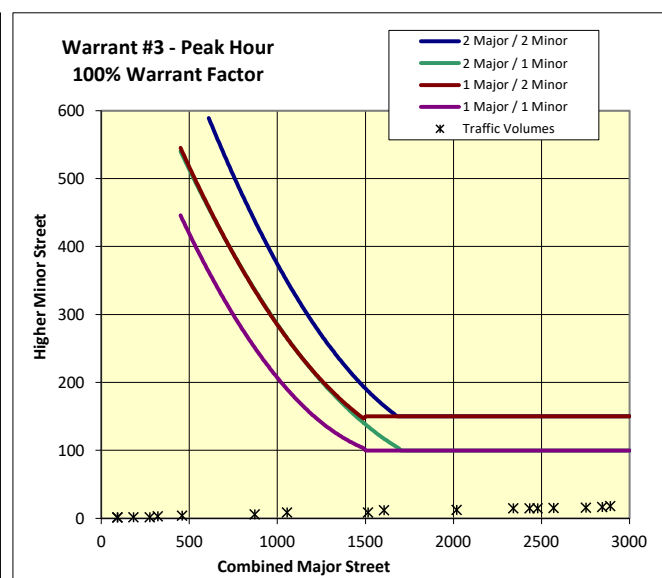
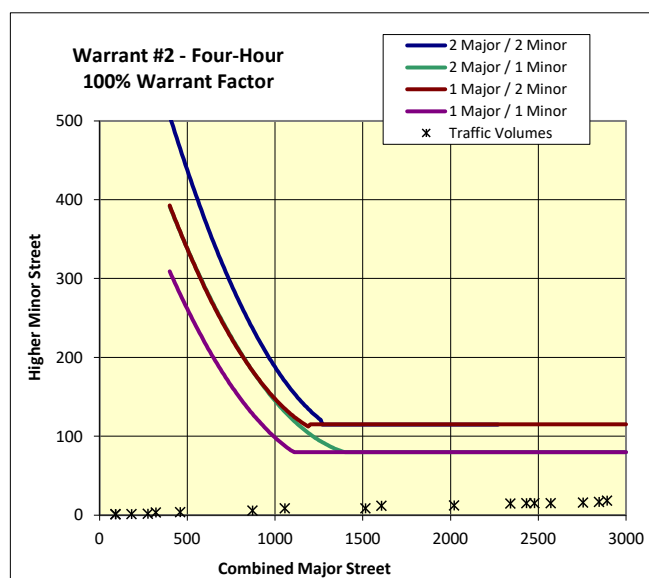
Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
5:00 PM	6:00 PM	1988	1455	11	28
2nd Highest Hour		1882	1377	10	25
3rd Highest Hour		1855	1358	9	22
4th Highest Hour		1776	1300	8	21
5th Highest Hour		1749	1280	7	19
6th Highest Hour		1749	1280	7	19
7th Highest Hour		1670	1222	7	18
8th Highest Hour		1643	1203	7	17
9th Highest Hour		1590	1164	6	16
10th Highest Hour		1484	1086	6	15
11th Highest Hour		1431	1048	6	15
12th Highest Hour		1405	1028	6	15
13th Highest Hour		1352	989	6	14
14th Highest Hour		1166	854	5	12
15th Highest Hour		928	679	5	12
16th Highest Hour		875	640	3	8
17th Highest Hour		610	446	3	8
18th Highest Hour		504	369	2	6
19th Highest Hour		265	194	1	4
20th Highest Hour		186	136	1	3
21st Highest Hour		159	116	1	2
22nd Highest Hour		106	78	0	1
23rd Highest Hour		53	39	0	1
24th Highest Hour		53	39	0	1

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Polina Polikakhina
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Warrant Harder&Dollar EX
Intersection: Harder Road & Dollar Street
Scenario: Existing PM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	1004	676	114	169
2nd Highest Hour		950	640	102	151
3rd Highest Hour		937	631	88	131
4th Highest Hour		897	604	87	129
5th Highest Hour		884	595	77	114
6th Highest Hour		884	595	76	113
7th Highest Hour		843	568	74	109
8th Highest Hour		830	559	67	100
9th Highest Hour		803	541	64	94
10th Highest Hour		750	505	61	91
11th Highest Hour		723	487	60	89
12th Highest Hour		709	478	60	89
13th Highest Hour		683	460	59	87
14th Highest Hour		589	397	49	73
15th Highest Hour		469	315	48	71
16th Highest Hour		442	297	34	51
17th Highest Hour		308	207	34	51
18th Highest Hour		254	171	23	35
19th Highest Hour		134	90	15	22
20th Highest Hour		94	63	12	18
21st Highest Hour		80	54	6	9
22nd Highest Hour		54	36	5	7
23rd Highest Hour		27	18	5	7
24th Highest Hour		27	18	4	5

Warrant Summary

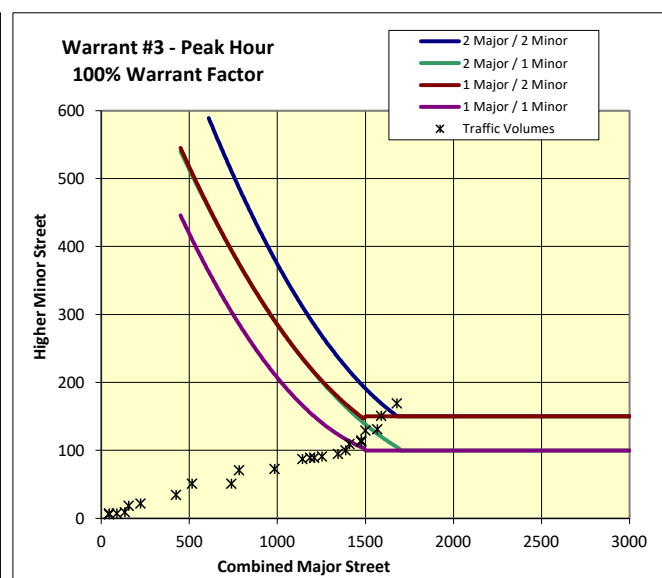
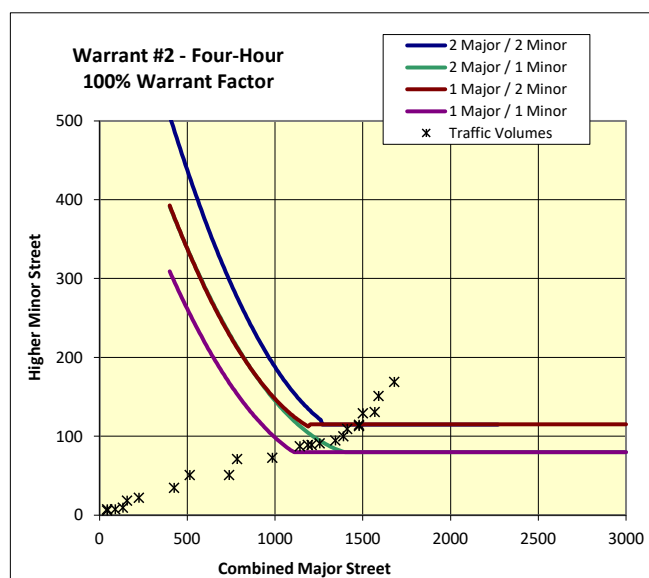
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	2	No	Yes
	B	900	75	13	Yes	
80%	A	480	120	4	No	Yes
	B	720	60	15	Yes	
70%	A	420	105	7	No	Yes
	B	630	53	15	Yes	
56%	A	336	84	13	Yes	Yes
	B	504	42	17	Yes	





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
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Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Warrant Harder&Dollar EX
Intersection: Harder Road & Dollar Street
Scenario: Existing PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	1004	676	114	169
2nd Highest Hour		950	640	102	151
3rd Highest Hour		937	631	88	131
4th Highest Hour		897	604	87	129
5th Highest Hour		884	595	77	114
6th Highest Hour		884	595	76	113
7th Highest Hour		843	568	74	109
8th Highest Hour		830	559	67	100
9th Highest Hour		803	541	64	94
10th Highest Hour		750	505	61	91
11th Highest Hour		723	487	60	89
12th Highest Hour		709	478	60	89
13th Highest Hour		683	460	59	87
14th Highest Hour		589	397	49	73
15th Highest Hour		469	315	48	71
16th Highest Hour		442	297	34	51
17th Highest Hour		308	207	34	51
18th Highest Hour		254	171	23	35
19th Highest Hour		134	90	15	22
20th Highest Hour		94	63	12	18
21st Highest Hour		80	54	6	9
22nd Highest Hour		54	36	5	7
23rd Highest Hour		27	18	5	7
24th Highest Hour		27	18	4	5

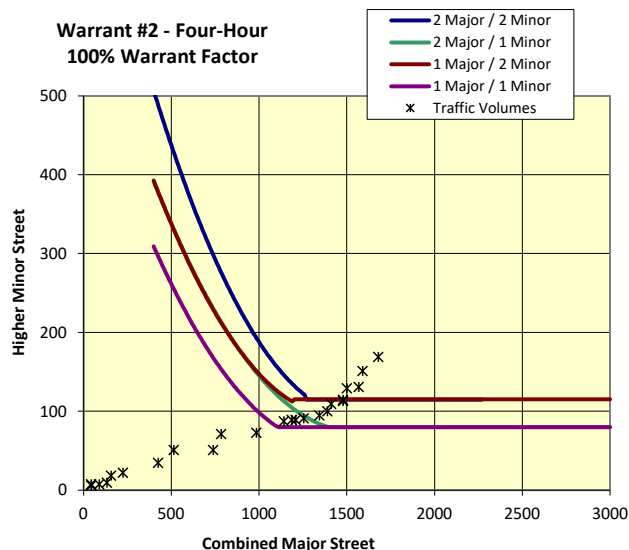
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

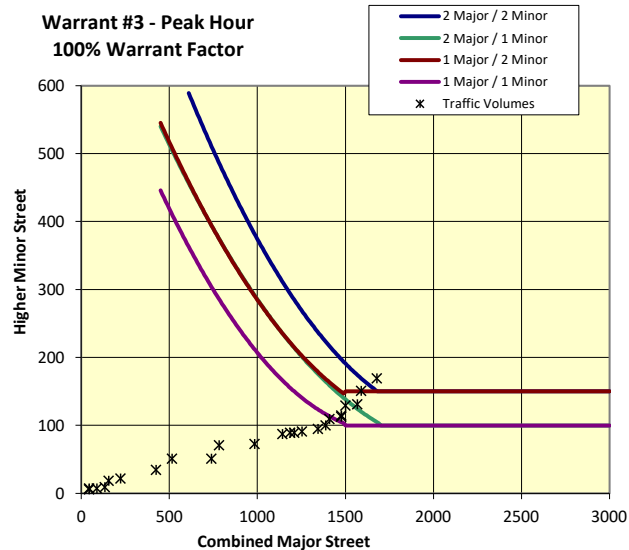
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	2	No	Yes
	B	900	75	13	Yes	
80%	A	480	120	4	No	Yes
	B	720	60	15	Yes	
70%	A	420	105	7	No	Yes
	B	630	53	15	Yes	
56%	A	336	84	13	Yes	Yes
	B	504	42	17	Yes	

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor



Appendix 3 Intersection Queue Spreadsheets

#	Intersection	Control	Movement		Storage	Existing				Existing Plus Project			
						AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?
1	Mission Blvd & Carlos Bee Blvd	Signal	NB	Left	250	105		137		108		141	
				Thru	1,160	430		641		440		651	
				Right	340	53		148		53		149	
			SB	Left	300	269		241		269		241	
				Thru	1,280	520		401		534		409	
				Right	195	91		65		93		67	
			EB	Left	160	143		97		143		97	
				Thru/Right	420	201		226		203		228	
			WB	Left	170	#289	Yes	137		#292	Yes	138	
				Thru	1,160	264		168		264		168	
				Right	260	104		217		105		217	
2	Mission Blvd & Berry Ave	Signal	NB	Left	255	69		m70		69		m67	
				Thru/Right	1,050	402		1,071	Yes	414		1,083	Yes
			SB	Left	140	77		109		77		109	
				Thru/Right	1,150	843		380		871		390	
			EB	Left/Thru/Right	670	130		84		130		84	
			WB	Left/Thru/Right	190	56		49		56		49	
3	Mission Blvd & Torrano Ave North	TWSC	NB	Thru	-	0		0		0		0	
			SB	Thru/Rught	920	0		0		0		0	
			EB	Left	410	8		10		8		10	
4	Mission Blvd & Torrano Ave South	TWSC	NB	Left	150	3		3		3		3	
				Thru/Right	350	0		0		0		0	
			SB	Left	220	8		30		8		30	
				Thru/Right	60	0		0		0		0	
			EB	Left/Thru/Right	100	0		28		0		28	
			WB	Left/Thru/Right	180	88		108		83		108	
5	Mission Blvd & Tennyson Rd	Signal	NB	Left	500	136		#276		136		#276	
				Thru/Right	1,300	332		675		345		679	
			SB	Left	240	28		72		31		73	
				Thru	1,020	558		469		577		475	
				Right	210	124		171		128		175	
			EB	Left	470	200		219		203		223	
				Thru	470	13		17		13		17	
				Right	225	73		78		72		78	
			WB	Left/Thru	360	39		52		39		52	
				Right	315	0		0		0		0	
6	Mission Blvd & Harder Rd	Signal	NB	Left	550	#387		#449		#425		#490	
				Thru/Right	1,040	372		578		372		596	
			SB	Left	250	87		105		87		106	
				Thru/Right	1,350	#738		520		#759		540	
			EB	Left	120	169	Yes	190	Yes	189	Yes	211	Yes
				Thru	280	203		134		206		137	
				Right	280	242		99		242		99	
				Left	240	#157		154		#157		151	

Project Contribution			
AM Queue	AM Cars	PM Queue	PM Cars
3	0.0	4	0.0
10	0.0	10	0.0
0	0.0	1	0.0
0	0.0	0	0.0
14	1.0	8	0.0
2	0.0	2	0.0
0	0.0	0	0.0
2	0.0	2	0.0
3	0.0	1	0.0
0	0.0	0	0.0
1	0.0	0	0.0
0	0.0	-3	0.0
12	0.0	12	0.0
0	0.0	0	0.0
28	1.0	10	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
-5	0.0	0	0.0
0	0.0	0	0.0
13	1.0	4	0.0
3	0.0	1	0.0
19	1.0	6	0.0
4	0.0	4	0.0
3	0.0	4	0.0
0	0.0	0	0.0
-1	0.0	0	0.0
0	0.0	0	0.0
0	0.0	0	0.0
38	2.0	41	2.0
0	0.0	18	1.0
0	0.0	1	0.0
21	1.0	20	1.0
20	1.0	21	1.0
3	0.0	3	0.0
0	0.0	0	0.0
0	0.0	-3	0.0

#	Intersection	Control	Movement		Storage	Existing				Existing Plus Project			
						AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?
			WB	Thru	415	89		198		93		201	
				Right	140	0		26		0		26	
7	Harder Rd & Dollar St	TWSC	NB	Left	140	105		180	Yes	338	Yes	428	Yes
				Thru/Right	140	15		23		45		63	
			SB	Left	65	30		53		48		78	Yes
				Thru/Right	190	73		28		100		33	
			EB	Left	190	5		8		5		8	
				Thru/Right	730	0		0		0		0	
			WB	Left	100	3		3		10		13	
				Thru/Right	280	0		0		0		0	
8	Harder Rd & Jane Ave	Signal	NB	Left/Thru/Right	185	44		31		44		34	
			SB	Left/Thru	200	198		167		198		167	
				Right	200	64		61		64		60	
			EB	Left	240	252	Yes	m386	Yes	252	Yes	m380	Yes
				Thru	890	220		233		234		241	
				Right	95	m0		m5		m0		m4	
			WB	Left	100	40		91		43		92	
				Thru	730	264		361		280		375	
				Right	120	45		53		45		53	
9	Harder Rd & Soto Rd	Signal	NB	Left	150	#220	Yes	#229	Yes	#219	Yes	#229	Yes
				Thru/Right	660	50		83		50		84	
			SB	Left	150	133		106		135		108	
				Thru/Right	570	317		198		318		198	
			EB	Left	295	276		#554	Yes	276		#554	Yes
				Thru/Right	1,350	377		568		392		#590	
			WB	Left	100	m25		m35		m26		m35	
				Thru	325	394	Yes	#414	Yes	#419	Yes	#433	Yes
				Right	150	74		139		78		143	

Notes:
= This is an estimate; the queue may be longer than the number indicated
m = The movement is metered by an upstream signal.

Project Contribution			
AM Queue	AM Cars	PM Queue	PM Cars
4	0.0	3	0.0
0	0.0	0	0.0
233	9.3	248	9.9
30	1.0	40	2.0
18	1.0	25	1.0
27	1.0	5	0.0
0	0.0	0	0.0
0	0.0	0	0.0
7	0.0	10	0.0
0	0.0	0	0.0
0	0.0	3	0.0
0	0.0	0	0.0
0	0.0	-1	0.0
0	0.0	-6	0.0
14	1.0	8	0.0
0	0.0	-1	0.0
3	0.0	1	0.0
16	1.0	14	1.0
0	0.0	0	0.0
-1	0.0	0	0.0
0	0.0	1	0.0
2	0.0	2	0.0
1	0.0	0	0.0
0	0.0	0	0.0
15	1.0	22	1.0
1	0.0	0	0.0
25	1.0	19	0.8
4	0.0	4	0.0

#	Intersection	Control	Movement		Storage	Cumulative				Cumulative Plus Project			
						AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?
1	Mission Blvd & Carlos Bee Blvd	Signal	NB	Left	250	#326	Yes	#223		#333	Yes	#221	
				Thru	1,160	#717		#1064		#732		#1077	
				Right	340	64		214		65		215	
			SB	Left	300	#347	Yes	#505	Yes	#347	Yes	#505	Yes
				Thru	1,280	#1204		#813		#1220		#841	
				Right	195	303	Yes	357	Yes	307	Yes	368	Yes
			EB	Left	160	#258	Yes	#716	Yes	#258	Yes	#716	Yes
				Thru/Right	420	238		547	Yes	241		550	Yes
			WB	Left	170	#346	Yes	#147		#350	Yes	#148	
				Thru	1,160	442		166		442		166	
	Right	260	191		#502	Yes	192		#502	Yes			
2	Mission Blvd & Berry Ave	Signal	NB	Left	255	#78		m87		#78		m87	
				Thru/Right	1,050	856		1,218	Yes	886		m1230	Yes
			SB	Left	140	#100		112		#102		113	
				Thru/Right	1,150	#2189	Yes	821		#2216	Yes	854	
			EB	Left/Thru/Right	670	#308		93		#307		95	
			WB	Left/Thru/Right	190	155		103		157		106	
3	Mission Blvd & Torrano Ave North	TWSC	NB	Thru	-	0		0		0		0	
			SB	Thru/Rught	920	0		0		0		0	
			EB	Left	410	23		13		25		13	
4	Mission Blvd & Torrano Ave South	TWSC	NB	Left	150	10		8		13		10	
				Thru/Right	350	0		0		0		0	
			SB	Left	220	30		68		30		70	
				Thru/Right	60	0		0		0		0	
			EB	Left/Thru/Right	100	0		53		0		63	
			WB	Left/Thru/Right	180	175		133		175		133	
5	Mission Blvd & Tennyson Rd	Signal	NB	Left	500	#384		#577	Yes	#384		#577	Yes
				Thru/Right	1,300	495		#695		500		#702	
			SB	Left	240	#101		#279	Yes	#110		#283	Yes
				Thru	1,020	#1316	Yes	498		#1327	Yes	505	
				Right	210	#744	Yes	#658	Yes	#751	Yes	#674	Yes
			EB	Left	470	412		#591	Yes	422		#602	Yes
				Thru	470	38		53		38		55	
				Right	225	366	Yes	100		#371	Yes	98	
			WB	Left/Thru	360	248		154		247		156	
				Right	315	0		0		0		0	
6	Mission Blvd & Harder Rd	Signal	NB	Left	550	#573	Yes	#926	Yes	#622	Yes	#957	Yes
				Thru/Right	1,040	412		742		412		742	
			SB	Left	250	92		m#171		91		m163	
				Thru/Right	1,350	#1419	Yes	#789		#1438	Yes	#804	
			EB	Left	120	242	Yes	#452	Yes	264	Yes	#499	Yes
				Thru	280	205		394	Yes	208		397	Yes
				Right	280	#700	Yes	#433	Yes	#703	Yes	#435	Yes
				Left	240	#236		#182		#236		#182	

Project Contribution			
AM Queue	AM Cars	PM Queue	PM Cars
7	0.0	-2	0.0
15	1.0	13	1.0
1	0.0	1	0.0
0	0.0	0	0.0
16	1.0	28	1.0
4	0.0	11	0.0
0	0.0	0	0.0
3	0.0	3	0.0
4	0.0	1	0.0
0	0.0	0	0.0
1	0.0	0	0.0
0	0.0	0	0.0
30	1.0	12	0.0
2	0.0	1	0.0
27	1.0	33	1.0
-1	0.0	2	0.0
2	0.0	3	0.0
0	0.0	0	0.0
0	0.0	0	0.0
2	0.0	0	0.0
3	0.0	2	0.0
0	0.0	0	0.0
0	0.0	2	0.0
0	0.0	0	0.0
0	0.0	10	0.0
0	0.0	0	0.0
0	0.0	0	0.0
5	0.0	7	0.0
9	0.0	4	0.0
11	0.0	7	0.0
7	0.0	16	1.0
10	0.0	11	0.0
0	0.0	2	0.0
5	0.0	-2	0.0
-1	0.0	2	0.0
0	0.0	0	0.0
49	2.0	31	1.0
0	0.0	0	0.0
-1	0.0	-8	0.0
19	1.0	15	1.0
22	1.0	47	2.0
3	0.0	3	0.0
3	0.0	2	0.0
0	0.0	0	0.0

#	Intersection	Control	Movement		Storage	Cumulative				Cumulative Plus Project			
						AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?
			WB	Thru	415	125		267		128		270	
				Right	140	45		1		45		1	
7	Harder Rd & Dollar St	TWSC	NB	Left	140	148	Yes	300	Yes	385	Yes	>140	Yes
				Thru/Right	140	23		133		80		343	Yes
			SB	Left	65	70	Yes	>70	Yes	108	Yes	>70	Yes
				Thru/Right	190	115		145		185		280	Yes
			EB	Left	190	8		18		8		18	
				Thru/Right	730	0		0		0		0	
			WB	Left	100	3		8		13		30	
				Thru/Right	280	0		0		0		0	
8	Harder Rd & Jane Ave	Signal	NB	Left/Thru/Right	185	43		30		43		32	
			SB	Left/Thru	200	209	Yes	222	Yes	209	Yes	222	Yes
				Right	200	62		53		61		53	
			EB	Left	240	#266	Yes	m#353	Yes	#271	Yes	m#349	Yes
				Thru	890	276		m#750		290		m#760	
				Right	95	m0		m3		m0		m2	
			WB	Left	100	40		91		43		94	
				Thru	730	270		#550		286		#573	
				Right	120	45		69		45		73	
9	Harder Rd & Soto Rd	Signal	NB	Left	150	#217	Yes	#228	Yes	#217	Yes	#228	Yes
				Thru/Right	660	50		86		50		88	
			SB	Left	150	150		176	Yes	154	Yes	179	Yes
				Thru/Right	570	322		202		322		202	
			EB	Left	295	276		#560	Yes	276		#562	Yes
				Thru/Right	1,350	406		#893		422		#917	
			WB	Left	100	m27		m29		m26		m31	
				Thru	325	#516	Yes	m#560	Yes	#541	Yes	m#558	Yes
				Right	150	98		m148		102		m145	

Notes:
= This is an estimate; the queue may be longer than the number indicated
m = The movement is metered by an upstream signal.

Project Contribution			
AM Queue	AM Cars	PM Queue	PM Cars
3	0.0	3	0.0
0	0.0	0	0.0
237	9.0	>140	>6
57	2.0	210	8.4
38	1.5	>70	>3
70	2.8	135	5.4
0	0.0	0	0.0
0	0.0	0	0.0
10	0.0	22	1.0
0	0.0	0	0.0
0	0.0	2	0.0
0	0.0	0	0.0
-1	0.0	0	0.0
5	0.0	-4	0.0
14	1.0	10	0.0
0	0.0	-1	0.0
3	0.0	3	0.0
16	1.0	23	1.0
0	0.0	4	0.0
0	0.0	0	0.0
0	0.0	2	0.0
4	0.0	3	0.0
0	0.0	0	0.0
0	0.0	2	0.0
16	1.0	24	1.0
-1	0.0	2	0.0
25	1.0	-2	0.0
4	0.0	-3	0.0

Appendix 4 Existing Plus Project Level of
Service, Queue, and Peak
Hour Traffic Signal Warrant
Worksheets

Level of Service Worksheets

HCM 6th Signalized Intersection Summary

1: Mission Boulevard & Carlos Bee Boulevard

Existing + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	270	72	363	439	276	61	1198	183	422	1539	160
Future Volume (veh/h)	195	270	72	363	439	276	61	1198	183	422	1539	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	212	293	78	395	477	300	66	1302	199	459	1673	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	263	505	132	417	803	356	85	2191	683	491	2681	785
Arrive On Green	0.08	0.18	0.18	0.12	0.22	0.22	0.05	0.44	0.44	0.14	0.53	0.53
Sat Flow, veh/h	3483	2804	733	3483	3582	1587	1781	5025	1567	3483	5066	1483
Grp Volume(v), veh/h	212	185	186	395	477	300	66	1302	199	459	1673	174
Grp Sat Flow(s),veh/h/ln	1742	1791	1746	1742	1791	1587	1781	1675	1567	1742	1689	1483
Q Serve(g_s), s	8.5	13.4	13.9	16.0	16.9	25.7	5.2	28.0	11.6	18.5	33.0	8.9
Cycle Q Clear(g_c), s	8.5	13.4	13.9	16.0	16.9	25.7	5.2	28.0	11.6	18.5	33.0	8.9
Prop In Lane	1.00		0.42	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	323	314	417	803	356	85	2191	683	491	2681	785
V/C Ratio(X)	0.81	0.57	0.59	0.95	0.59	0.84	0.78	0.59	0.29	0.94	0.62	0.22
Avail Cap(c_a), veh/h	343	467	455	417	1009	447	251	2191	683	491	2681	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.6	53.2	53.4	62.1	49.3	52.7	66.9	30.5	25.9	60.4	23.5	17.8
Incr Delay (d2), s/veh	10.1	1.6	1.8	30.9	0.7	11.3	14.1	1.2	1.1	25.5	1.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	6.3	6.3	8.9	7.7	11.4	2.7	11.4	4.7	9.9	13.1	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.8	54.8	55.2	93.0	50.0	64.0	81.0	31.7	26.9	85.9	24.6	18.5
LnGrp LOS	E	D	E	F	D	E	F	C	C	F	C	B
Approach Vol, veh/h	583			1172			1567			2306		
Approach Delay, s/veh	62.2			68.1			33.1			36.3		
Approach LOS	E			E			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	80.2	14.7	36.3	24.0	66.9	21.0	30.1				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	20.0	50.5	14.0	40.0	20.0	50.5	17.0	37.0				
Max Q Clear Time (g_c+I1), s	7.2	35.0	10.5	27.7	20.5	30.0	18.0	15.9				
Green Ext Time (p_c), s	0.1	10.7	0.2	3.5	0.0	10.2	0.0	2.3				
Intersection Summary												
HCM 6th Ctrl Delay	44.7											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

2: Mission Boulevard & Berry Avenue

Existing + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	53	4	35	22	2	6	33	1327	4	39	1880	53
Future Volume (veh/h)	53	4	35	22	2	6	33	1327	4	39	1880	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1811	1841	1841	1900	1856	1856
Adj Flow Rate, veh/h	58	4	38	24	2	7	36	1442	4	42	2043	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	6	4	4	0	3	3
Cap, veh/h	140	18	72	167	18	38	51	2691	7	57	2639	74
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.03	0.75	0.75	0.03	0.75	0.75
Sat Flow, veh/h	801	146	580	991	144	306	1725	3577	10	1810	3499	99
Grp Volume(v), veh/h	100	0	0	33	0	0	36	705	741	42	1024	1077
Grp Sat Flow(s), veh/h/ln	1527	0	0	1440	0	0	1725	1749	1839	1810	1763	1835
Q Serve(g_s), s	5.6	0.0	0.0	0.0	0.0	0.0	2.9	23.6	23.6	3.2	48.0	49.3
Cycle Q Clear(g_c), s	8.3	0.0	0.0	2.7	0.0	0.0	2.9	23.6	23.6	3.2	48.0	49.3
Prop In Lane	0.58		0.38	0.73		0.21	1.00		0.01	1.00		0.05
Lane Grp Cap(c), veh/h	230	0	0	223	0	0	51	1315	1383	57	1329	1384
V/C Ratio(X)	0.44	0.00	0.00	0.15	0.00	0.00	0.71	0.54	0.54	0.74	0.77	0.78
Avail Cap(c_a), veh/h	392	0	0	380	0	0	73	1315	1383	77	1329	1384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.6	0.0	0.0	55.2	0.0	0.0	67.8	7.3	7.3	67.7	10.2	10.3
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.3	0.0	0.0	16.5	1.6	1.5	21.6	4.3	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	1.1	0.0	0.0	1.5	8.4	8.8	1.8	17.5	18.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.9	0.0	0.0	55.5	0.0	0.0	84.3	8.8	8.7	89.3	14.5	14.7
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	B	B
Approach Vol, veh/h	100			33			1482			2143		
Approach Delay, s/veh	58.9			55.5			10.6			16.1		
Approach LOS	E			E			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	111.3		21.5	8.4	111.1		21.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	6.0	89.0		33.0	6.0	89.0		33.0				
Max Q Clear Time (g_c+14.5), s	14.5	51.3		4.7	5.2	25.6		10.3				
Green Ext Time (p_c), s	0.0	25.5		0.1	0.0	15.1		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			15.4									
HCM 6th LOS			B									

HCM 6th TWSC

3: Mission Boulevard & Torrano Ave (N)

Existing + Project
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	22	0	1382	1796	122
Future Vol, veh/h	0	22	0	1382	1796	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	4	3	3
Mvmt Flow	0	24	0	1486	1931	131
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1031	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	234	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	234	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.1	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	234	-	-		
HCM Lane V/C Ratio	-	0.101	-	-		
HCM Control Delay (s)	-	22.1	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.3	-	-		

HCM 6th TWSC

4: Mission Boulevard & Torrano Ave (S)

Existing + Project
Timing Plan: AM

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↔	↕		↔	↕	
Traffic Vol, veh/h	0	0	0	9	0	30	11	1334	16	37	1780	2
Future Vol, veh/h	0	0	0	9	0	30	11	1334	16	37	1780	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	0	10	0	32	12	1434	17	40	1914	2
Major/Minor	Minor2		Minor1				Major1			Major2		
Conflicting Flow All	2780	3502	994	2528	3495	758	1938	0	0	1461	0	0
Stage 1	2017	2017	-	1477	1477	-	-	-	-	-	-	-
Stage 2	763	1485	-	1051	2018	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	9	6	247	14	6	354	307	-	-	469	-	-
Stage 1	62	104	-	135	192	-	-	-	-	-	-	-
Stage 2	367	190	-	246	103	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	5	239	12	5	343	301	-	-	465	-	-
Mov Cap-2 Maneuver	7	5	-	12	5	-	-	-	-	-	-	-
Stage 1	58	93	-	128	182	-	-	-	-	-	-	-
Stage 2	313	181	-	222	92	-	-	-	-	-	-	-
Approach	EB		WB				NB			SB		
HCM Control Delay, s	0		234.4				0.1			0.3		
HCM LOS	A		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	301	-	-	-	47	465	-	-				
HCM Lane V/C Ratio	0.039	-	-	-	0.892	0.086	-	-				
HCM Control Delay (s)	17.4	-	-	0	234.4	13.5	-	-				
HCM Lane LOS	C	-	-	A	F	B	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	-	3.7	0.3	-	-				

HCM 6th Signalized Intersection Summary

5: Mission Boulevard & Tennyson Road

Existing + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	343	4	251	8	6	2	198	1308	0	11	1689	244
Future Volume (veh/h)	343	4	251	8	6	2	198	1308	0	11	1689	244
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	385	4	282	9	7	2	222	1470	0	12	1898	274
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	692	374	317	22	17	35	154	3209	0	29	3065	951
Arrive On Green	0.20	0.20	0.20	0.02	0.02	0.02	0.04	0.63	0.00	0.02	0.60	0.60
Sat Flow, veh/h	3456	1870	1585	1023	796	1585	3456	5274	0	1781	5106	1585
Grp Volume(v), veh/h	385	4	282	16	0	2	222	1470	0	12	1898	274
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1819	0	1585	1728	1702	0	1781	1702	1585
Q Serve(g_s), s	13.5	0.2	23.4	1.2	0.0	0.2	6.0	20.3	0.0	0.9	31.9	11.3
Cycle Q Clear(g_c), s	13.5	0.2	23.4	1.2	0.0	0.2	6.0	20.3	0.0	0.9	31.9	11.3
Prop In Lane	1.00		1.00	0.56		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	692	374	317	40	0	35	154	3209	0	29	3065	951
V/C Ratio(X)	0.56	0.01	0.89	0.40	0.00	0.06	1.45	0.46	0.00	0.42	0.62	0.29
Avail Cap(c_a), veh/h	845	457	387	445	0	387	154	3209	0	79	3065	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	43.3	52.5	65.2	0.0	64.7	64.5	13.1	0.0	65.8	17.2	13.0
Incr Delay (d2), s/veh	0.7	0.0	18.9	6.5	0.0	0.7	233.1	0.5	0.0	9.4	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.1	11.0	0.6	0.0	0.1	7.6	7.4	0.0	0.5	12.2	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	43.3	71.4	71.6	0.0	65.4	297.6	13.6	0.0	75.2	18.1	13.8
LnGrp LOS	D	D	E	E	A	E	F	B	A	E	B	B
Approach Vol, veh/h	671			18			1692			2184		
Approach Delay, s/veh	58.5			70.9			50.8			17.9		
Approach LOS	E			E			D			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	10.0	86.0	6.9		6.2	89.9	32.0					
Change Period (Y+Rc), s	4.0	5.0	4.0		4.0	5.0	5.0					
Max Green Setting (Gmax), s	6.0	45.0	33.0		6.0	45.0	33.0					
Max Q Clear Time (g_c+I1), s	8.0	33.9	3.2		2.9	22.3	25.4					
Green Ext Time (p_c), s	0.0	9.0	0.0		0.0	11.0	1.7					
Intersection Summary												
HCM 6th Ctrl Delay	36.3											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

6: Mission Boulevard & Harder Road

Existing + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	312	354	356	174	117	34	250	1014	170	47	1589	159
Future Volume (veh/h)	312	354	356	174	117	34	250	1014	170	47	1589	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1885	1856	1900	1870	1589	1870	1841	1841	1841	1856	1856
Adj Flow Rate, veh/h	363	412	414	202	136	40	291	1179	198	55	1848	185
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	4	1	3	0	2	21	2	4	4	4	3	3
Cap, veh/h	764	928	399	227	352	129	295	1490	250	367	1816	181
Arrive On Green	0.22	0.26	0.26	0.06	0.10	0.10	0.17	0.34	0.34	0.21	0.39	0.39
Sat Flow, veh/h	3401	3582	1540	3510	3554	1299	1781	4320	725	1753	4674	465
Grp Volume(v), veh/h	363	412	414	202	136	40	291	914	463	55	1332	701
Grp Sat Flow(s),veh/h/ln	1700	1791	1540	1755	1777	1299	1781	1675	1695	1753	1689	1763
Q Serve(g_s), s	12.9	13.4	36.0	7.9	5.0	4.0	22.7	34.2	34.2	3.6	54.0	54.0
Cycle Q Clear(g_c), s	12.9	13.4	36.0	7.9	5.0	4.0	22.7	34.2	34.2	3.6	54.0	54.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.43	1.00		0.26
Lane Grp Cap(c), veh/h	764	928	399	227	352	129	295	1155	585	367	1312	685
V/C Ratio(X)	0.48	0.44	1.04	0.89	0.39	0.31	0.99	0.79	0.79	0.15	1.02	1.02
Avail Cap(c_a), veh/h	764	928	399	227	818	299	295	1639	829	367	1312	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	43.1	51.5	64.5	58.6	58.2	57.9	41.0	41.0	44.9	42.5	42.5
Incr Delay (d2), s/veh	0.5	0.3	55.3	31.9	0.7	1.4	48.8	5.6	10.5	0.2	28.8	40.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	6.0	19.8	4.5	2.3	1.4	14.1	14.8	15.8	1.6	27.2	30.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.2	43.5	106.8	96.4	59.3	59.5	106.6	46.6	51.6	45.1	71.3	82.9
LnGrp LOS	D	D	F	F	E	E	F	D	D	D	F	F
Approach Vol, veh/h	1189			378			1668			2088		
Approach Delay, s/veh	66.7			79.2			58.5			74.5		
Approach LOS	E			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	59.0	35.2	17.8	33.1	52.9	13.0	40.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	28.0	54.0	13.0	32.0	9.0	68.0	9.0	36.0				
Max Q Clear Time (g_c+Q), s	24.3	56.0	14.9	7.0	5.6	36.2	9.9	38.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	11.7	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	68.0
HCM 6th LOS	E

HCM 6th TWSC

7: Dollar Street & Harder Road

Existing + Project
Timing Plan: AM

Intersection												
Int Delay, s/veh	74.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	783	134	62	526	13	99	8	79	24	13	181
Future Vol, veh/h	59	783	134	62	526	13	99	8	79	24	13	181
Conflicting Peds, #/hr	6	0	10	10	0	6	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	6	3	0	0	4	0	0	20	0	9	0	3
Mvmt Flow	69	910	156	72	612	15	115	9	92	28	15	210
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	633	0	0	1076	0	0	1596	1913	543	1368	1984	322
Stage 1	-	-	-	-	-	-	1136	1136	-	770	770	-
Stage 2	-	-	-	-	-	-	460	777	-	598	1214	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.5	6.9	6.9	7.68	6.5	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.5	4.2	3.3	3.59	4	3.33
Pot Cap-1 Maneuver	919	-	-	656	-	-	~ 73	55	489	99	62	671
Stage 1	-	-	-	-	-	-	218	240	-	344	413	-
Stage 2	-	-	-	-	-	-	556	365	-	439	257	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	914	-	-	650	-	-	~ 33	44	484	58	50	666
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 33	44	-	58	50	-
Stage 1	-	-	-	-	-	-	200	220	-	316	365	-
Stage 2	-	-	-	-	-	-	324	323	-	315	235	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			1.2			\$ 742.6			39		
HCM LOS							F			E		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	33	252	914	-	-	650	-	-	58	365		
HCM Lane V/C Ratio	3.488	0.401	0.075	-	-	0.111	-	-	0.481	0.618		
HCM Control Delay (s)	\$ 1370.2	28.5	9.3	-	-	11.2	-	-	114.9	29.6		
HCM Lane LOS	F	D	A	-	-	B	-	-	F	D		
HCM 95th %tile Q(veh)	13.5	1.8	0.2	-	-	0.4	-	-	1.9	4		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 6th Signalized Intersection Summary

8: Jane Avenue & Harder Road

Existing + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (veh/h)	210	789	4	22	654	149	27	49	58	175	19	338
Future Volume (veh/h)	210	789	4	22	654	149	27	49	58	175	19	338
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	228	858	4	24	711	162	29	53	63	190	21	367
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	258	2130	947	34	1682	739	101	199	282	327	29	427
Arrive On Green	0.19	0.79	0.79	0.02	0.47	0.47	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	3582	1594	1795	3582	1575	190	742	1050	985	109	1590
Grp Volume(v), veh/h	228	858	4	24	711	162	54	0	91	211	0	367
Grp Sat Flow(s),veh/h/ln	1795	1791	1594	1795	1791	1575	462	0	1521	1094	0	1590
Q Serve(g_s), s	13.6	8.1	0.1	1.5	14.5	6.7	1.8	0.0	5.1	16.2	0.0	24.1
Cycle Q Clear(g_c), s	13.6	8.1	0.1	1.5	14.5	6.7	23.2	0.0	5.1	21.4	0.0	24.1
Prop In Lane	1.00		1.00	1.00		1.00	0.54		0.69	0.90		1.00
Lane Grp Cap(c), veh/h	258	2130	947	34	1682	739	174	0	408	356	0	427
V/C Ratio(X)	0.88	0.40	0.00	0.71	0.42	0.22	0.31	0.00	0.22	0.59	0.00	0.86
Avail Cap(c_a), veh/h	326	2130	947	196	1682	739	296	0	553	482	0	578
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.6	5.5	4.7	53.7	19.3	17.3	36.3	0.0	31.3	39.6	0.0	38.3
Incr Delay (d2), s/veh	16.1	0.4	0.0	23.5	0.8	0.7	1.0	0.0	0.3	1.6	0.0	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	2.5	0.0	0.9	6.0	2.5	1.4	0.0	1.9	5.5	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.6	5.9	4.7	77.2	20.1	17.9	37.3	0.0	31.6	41.2	0.0	47.9
LnGrp LOS	E	A	A	E	C	B	D	A	C	D	A	D
Approach Vol, veh/h		1090			897			145			578	
Approach Delay, s/veh		17.2			21.2			33.7			45.4	
Approach LOS		B			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	70.4		33.5	19.8	56.6		33.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	20.0	37.0		40.0				
Max Q Clear Time (g_c+I1), s	3.5	10.1		26.1	15.6	16.5		25.2				
Green Ext Time (p_c), s	0.0	6.9		2.4	0.3	5.3		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				25.4								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Existing + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	259	922	71	15	781	95	116	38	26	138	30	593
Future Volume (veh/h)	259	922	71	15	781	95	116	38	26	138	30	593
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	1072	83	17	908	110	135	44	30	160	35	690
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1680	130	39	1206	510	65	358	244	484	27	524
Arrive On Green	0.19	0.51	0.51	0.02	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	3326	257	1781	3554	1503	729	1035	706	1323	77	1516
Grp Volume(v), veh/h	301	572	583	17	908	110	135	0	74	160	0	725
Grp Sat Flow(s), veh/h/ln	1781	1777	1806	1781	1777	1503	729	0	1741	1323	0	1593
Q Serve(g_s), s	18.2	25.9	25.9	1.0	24.9	5.7	0.0	0.0	3.2	10.3	0.0	38.0
Cycle Q Clear(g_c), s	18.2	25.9	25.9	1.0	24.9	5.7	38.0	0.0	3.2	13.5	0.0	38.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.41	1.00		0.95
Lane Grp Cap(c), veh/h	335	898	913	39	1206	510	65	0	601	484	0	550
V/C Ratio(X)	0.90	0.64	0.64	0.43	0.75	0.22	2.06	0.00	0.12	0.33	0.00	1.32
Avail Cap(c_a), veh/h	437	898	913	194	1206	510	65	0	601	484	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.6	19.9	19.9	53.1	32.2	25.9	55.0	0.0	24.6	29.2	0.0	36.0
Incr Delay (d2), s/veh	17.7	3.5	3.4	6.4	3.9	0.9	526.6	0.0	0.1	0.4	0.0	155.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	11.0	11.2	0.5	11.1	2.1	11.4	0.0	1.4	3.4	0.0	38.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	23.3	23.3	59.5	36.1	26.8	581.6	0.0	24.7	29.6	0.0	191.4
LnGrp LOS	E	C	C	E	D	C	F	A	C	C	A	F
Approach Vol, veh/h	1456			1035			209			885		
Approach Delay, s/veh	31.2			35.5			384.4			162.2		
Approach LOS	C			D			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	60.6			43.0	24.7	42.3		43.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0			38.0	27.0	31.0		38.0				
Max Q Clear Time (g_c+13), s	27.9			40.0	20.2	26.9		40.0				
Green Ext Time (p_c), s	0.0	7.3		0.0	0.5	2.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	85.3											
HCM 6th LOS	F											

HCM 6th TWSC

10: Harder Road & North Driveway

Existing + Project
Timing Plan: AM

Intersection

Int Delay, s/veh 0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	15	0	1430	2101	18
Future Vol, veh/h	0	15	0	1430	2101	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	17	0	1663	2443	21

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1232	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.1	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.9	- -	- -
Pot Cap-1 Maneuver	0 147	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 147	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	32.8	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 147	- -	- -
HCM Lane V/C Ratio	- 0.119	- -	- -
HCM Control Delay (s)	- 32.8	- -	- -
HCM Lane LOS	- D	- -	- -
HCM 95th %tile Q(veh)	- 0.4	- -	- -

HCM 6th TWSC

11: Harder Road & South Driveway

Existing + Project
Timing Plan: AM

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	16	10	1426	2100	17
Future Vol, veh/h	0	16	10	1426	2100	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	19	12	1658	2442	20

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1231	2462	0 - 0
Stage 1	- -	-	- - -
Stage 2	- -	-	- - -
Critical Hdwy	- 6.9	4.1	- - -
Critical Hdwy Stg 1	- -	-	- - -
Critical Hdwy Stg 2	- -	-	- - -
Follow-up Hdwy	- 3.3	2.2	- - -
Pot Cap-1 Maneuver	0 172	192	- - -
Stage 1	0 -	-	- - -
Stage 2	0 -	-	- - -
Platoon blocked, %			- - -
Mov Cap-1 Maneuver	- 172	192	- - -
Mov Cap-2 Maneuver	- -	-	- - -
Stage 1	- -	-	- - -
Stage 2	- -	-	- - -

Approach	EB	NB	SB
HCM Control Delay, s	28.5	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	192	-	172	-	-
HCM Lane V/C Ratio	0.061	-	0.108	-	-
HCM Control Delay (s)	25	-	28.5	-	-
HCM Lane LOS	C	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-

HCM 6th Signalized Intersection Summary

1: Mission Boulevard & Carlos Bee Boulevard

Existing + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	307	48	175	261	331	81	1651	334	362	1302	163
Future Volume (veh/h)	113	307	48	175	261	331	81	1651	334	362	1302	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	123	334	52	190	284	360	88	1795	363	393	1415	177
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	168	700	108	237	877	389	109	2317	723	447	2677	784
Arrive On Green	0.05	0.23	0.23	0.07	0.24	0.24	0.06	0.46	0.46	0.13	0.53	0.53
Sat Flow, veh/h	3483	3107	479	3483	3582	1588	1781	5025	1567	3483	5066	1483
Grp Volume(v), veh/h	123	191	195	190	284	360	88	1795	363	393	1415	177
Grp Sat Flow(s),veh/h/ln	1742	1791	1795	1742	1791	1588	1781	1675	1567	1742	1689	1483
Q Serve(g_s), s	5.2	13.8	14.1	8.0	9.7	33.0	7.3	44.6	24.2	16.5	27.2	9.5
Cycle Q Clear(g_c), s	5.2	13.8	14.1	8.0	9.7	33.0	7.3	44.6	24.2	16.5	27.2	9.5
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	403	404	237	877	389	109	2317	723	447	2677	784
V/C Ratio(X)	0.73	0.47	0.48	0.80	0.32	0.93	0.81	0.77	0.50	0.88	0.53	0.23
Avail Cap(c_a), veh/h	210	445	446	281	962	426	155	2317	723	538	2677	784
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.9	50.1	50.2	68.5	46.2	55.0	69.1	33.7	28.2	63.8	23.0	18.8
Incr Delay (d2), s/veh	9.4	0.9	0.9	13.3	0.2	25.1	18.6	2.6	2.5	13.5	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	6.4	6.5	4.0	4.4	16.0	3.9	18.4	9.8	8.1	10.9	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.3	50.9	51.1	81.8	46.4	80.0	87.7	36.3	30.6	77.3	23.7	19.5
LnGrp LOS	E	D	D	F	D	F	F	D	C	E	C	B
Approach Vol, veh/h		509			834			2246			1985	
Approach Delay, s/veh		57.8			69.0			37.4			34.0	
Approach LOS		E			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	83.7	11.2	41.0	23.1	73.7	14.1	38.1				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	13.0	69.5	9.0	40.0	23.0	59.5	12.0	37.0				
Max Q Clear Time (g_c+I1), s	9.3	29.2	7.2	35.0	18.5	46.6	10.0	16.1				
Green Ext Time (p_c), s	0.1	15.0	0.1	1.5	0.6	10.1	0.1	2.3				
Intersection Summary												
HCM 6th Ctrl Delay			42.8									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary

2: Mission Boulevard & Berry Avenue

Existing + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	31	3	21	16	2	7	50	1986	6	61	1440	40
Future Volume (veh/h)	31	3	21	16	2	7	50	1986	6	61	1440	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.97	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	32	3	22	16	2	7	52	2047	6	63	1485	41
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	1	1	0	2	2
Cap, veh/h	83	14	37	96	17	29	67	2957	9	80	2874	79
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.07	1.00	1.00	0.04	0.81	0.81
Sat Flow, veh/h	738	222	603	922	271	464	1781	3663	11	1810	3530	97
Grp Volume(v), veh/h	57	0	0	25	0	0	52	1000	1053	63	746	780
Grp Sat Flow(s), veh/h/ln	1564	0	0	1657	0	0	1781	1791	1883	1810	1777	1850
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	5.2	20.2	20.3
Cycle Q Clear(g_c), s	5.2	0.0	0.0	2.0	0.0	0.0	4.3	0.0	0.0	5.2	20.2	20.3
Prop In Lane	0.56		0.39	0.64		0.28	1.00		0.01	1.00		0.05
Lane Grp Cap(c), veh/h	134	0	0	142	0	0	67	1446	1520	80	1447	1507
V/C Ratio(X)	0.43	0.00	0.00	0.18	0.00	0.00	0.78	0.69	0.69	0.78	0.52	0.52
Avail Cap(c_a), veh/h	372	0	0	375	0	0	119	1446	1520	109	1447	1507
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.3	0.0	0.0	67.0	0.0	0.0	68.8	0.0	0.0	71.0	4.5	4.5
Incr Delay (d2), s/veh	2.1	0.0	0.0	0.6	0.0	0.0	17.7	2.7	2.6	22.5	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	0.0	0.9	0.0	0.0	2.2	1.1	1.1	2.9	6.8	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.5	0.0	0.0	67.5	0.0	0.0	86.5	2.7	2.6	93.4	5.8	5.7
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	A	A
Approach Vol, veh/h		57			25			2105			1589	
Approach Delay, s/veh		70.5			67.5			4.8			9.2	
Approach LOS		E			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	127.1		13.3	10.7	126.1		13.3				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	94.0	94.0		33.0	9.0	95.0		33.0				
Max Q Clear Time (g_c+16.3), s	22.3	22.3		4.0	7.2	2.0		7.2				
Green Ext Time (p_c), s	0.0	18.4		0.1	0.0	40.9		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

HCM 6th TWSC

3: Mission Boulevard & Torrano Avenue (N)

Existing + Project
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	37	0	2014	1439	53
Future Vol, veh/h	0	37	0	2014	1439	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	2	2
Mvmt Flow	0	39	0	2120	1515	56
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	786	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	339	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	339	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	17	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	339	-	-		
HCM Lane V/C Ratio	-	0.115	-	-		
HCM Control Delay (s)	-	17	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.4	-	-		

HCM 6th TWSC

4: Mission Boulevard & Torrano Avenue (S)

Existing + Project
Timing Plan: PM

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	9	7	0	21	19	1954	37	76	1396	4
Future Vol, veh/h	2	0	9	7	0	21	19	1954	37	76	1396	4
Conflicting Peds, #/hr	4	0	8	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	0	9	7	0	22	20	2057	39	80	1469	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	2704	3767	745	3020	3750	1052	1473	0	0	2096	0	0
Stage 1	1631	1631	-	2117	2117	-	-	-	-	-	-	-
Stage 2	1073	2136	-	903	1633	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	10	4	361	~ 6	4	226	464	-	-	267	-	-
Stage 1	108	161	-	53	92	-	-	-	-	-	-	-
Stage 2	239	90	-	303	161	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	3	358	~ 4	3	225	464	-	-	267	-	-
Mov Cap-2 Maneuver	7	3	-	~ 4	3	-	-	-	-	-	-	-
Stage 1	103	113	-	51	88	-	-	-	-	-	-	-
Stage 2	205	86	-	205	113	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	152.2		\$ 971.4			0.1			1.2			
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	464	-	-	35	15	267	-	-				
HCM Lane V/C Ratio	0.043	-	-	0.331	1.965	0.3	-	-				
HCM Control Delay (s)	13.1	-	-	152.2	\$ 971.4	24.1	-	-				
HCM Lane LOS	B	-	-	F	F	C	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.1	4.3	1.2	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon						

HCM 6th Signalized Intersection Summary

5: Mission Boulevard & Tennyson Road

Existing + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	5	251	10	18	3	384	1718	2	34	1223	334
Future Volume (veh/h)	365	5	251	10	18	3	384	1718	2	34	1223	334
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	372	5	256	10	18	3	392	1753	2	35	1248	341
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	633	342	290	19	34	46	248	3372	4	54	3057	949
Arrive On Green	0.18	0.18	0.18	0.03	0.03	0.03	0.07	0.64	0.64	0.03	0.60	0.60
Sat Flow, veh/h	3456	1870	1585	656	1181	1585	3456	5267	6	1781	5106	1585
Grp Volume(v), veh/h	372	5	256	28	0	3	392	1133	622	35	1248	341
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1838	0	1585	1728	1702	1869	1781	1702	1585
Q Serve(g_s), s	15.1	0.3	24.1	2.3	0.0	0.3	11.0	27.5	27.5	3.0	19.9	16.8
Cycle Q Clear(g_c), s	15.1	0.3	24.1	2.3	0.0	0.3	11.0	27.5	27.5	3.0	19.9	16.8
Prop In Lane	1.00		1.00	0.36		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	633	342	290	53	0	46	248	2179	1197	54	3057	949
V/C Ratio(X)	0.59	0.01	0.88	0.53	0.00	0.07	1.58	0.52	0.52	0.65	0.41	0.36
Avail Cap(c_a), veh/h	858	465	394	456	0	394	248	2179	1197	128	3057	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.2	51.2	60.9	73.3	0.0	72.3	71.0	14.8	14.8	73.4	16.3	15.7
Incr Delay (d2), s/veh	0.9	0.0	16.1	8.0	0.0	0.6	278.5	0.9	1.6	12.3	0.4	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	0.2	11.1	1.2	0.0	0.1	14.4	10.4	11.7	1.5	7.8	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	51.2	77.0	81.3	0.0	72.9	349.5	15.7	16.5	85.6	16.7	16.8
LnGrp LOS	E	D	E	F	A	E	F	B	B	F	B	B
Approach Vol, veh/h	633			31			2147			1624		
Approach Delay, s/veh	65.7			80.5			76.9			18.2		
Approach LOS	E			F			E			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	15.0	96.6	8.4		8.6	102.9	33.0					
Change Period (Y+Rc), s	4.0	5.0	4.0		4.0	5.0	5.0					
Max Green Setting (Gmax), s	11.0	48.0	38.0		11.0	48.0	38.0					
Max Q Clear Time (g_c+I1), s	13.0	21.9	4.3		5.0	29.5	26.1					
Green Ext Time (p_c), s	0.0	11.7	0.1		0.0	11.3	1.9					
Intersection Summary												
HCM 6th Ctrl Delay	53.8											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

6: Mission Boulevard & Harder Road

Existing + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	190	324	226	294	77	342	1616	229	54	1127	226
Future Volume (veh/h)	316	190	324	226	294	77	342	1616	229	54	1127	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1885	1900	1900	1841	1885	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	333	200	341	238	309	81	360	1701	241	57	1186	238
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	0	0	4	1	1	1	0	2	2
Cap, veh/h	587	811	358	287	509	213	495	2033	286	237	1288	259
Arrive On Green	0.17	0.23	0.23	0.08	0.14	0.14	0.28	0.45	0.45	0.17	0.40	0.40
Sat Flow, veh/h	3510	3582	1579	3510	3610	1510	1795	4543	640	1810	4252	853
Grp Volume(v), veh/h	333	200	341	238	309	81	360	1282	660	57	950	474
Grp Sat Flow(s),veh/h/ln	1755	1791	1579	1755	1805	1510	1795	1716	1752	1810	1702	1701
Q Serve(g_s), s	13.1	6.9	32.0	10.0	12.1	7.3	27.3	49.4	50.1	4.1	39.7	39.7
Cycle Q Clear(g_c), s	13.1	6.9	32.0	10.0	12.1	7.3	27.3	49.4	50.1	4.1	39.7	39.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.50
Lane Grp Cap(c), veh/h	587	811	358	287	509	213	495	1536	784	237	1031	515
V/C Ratio(X)	0.57	0.25	0.95	0.83	0.61	0.38	0.73	0.83	0.84	0.24	0.92	0.92
Avail Cap(c_a), veh/h	587	812	358	351	770	322	495	1716	876	237	1067	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	47.5	57.2	67.9	60.5	58.5	49.2	36.5	36.7	55.5	43.1	43.1
Incr Delay (d2), s/veh	1.3	0.2	35.5	13.0	1.2	1.1	5.3	5.5	10.6	0.5	14.4	24.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	3.1	16.2	5.0	5.6	2.9	12.9	21.5	23.4	1.9	17.7	19.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	47.7	92.7	80.9	61.7	59.6	54.6	42.1	47.3	56.0	57.5	67.2
LnGrp LOS	E	D	F	F	E	E	D	D	D	E	E	E
Approach Vol, veh/h	874			628			2302			1481		
Approach Delay, s/veh	69.5			68.7			45.5			60.6		
Approach LOS	E			E			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	45.3	50.5	29.1	25.1	23.6	72.1	16.2	38.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	37.0	47.0	17.0	32.0	9.0	75.0	15.0	34.0				
Max Q Clear Time (g_c+29.3), s	41.7	41.7	15.1	14.1	6.1	52.1	12.0	34.0				
Green Ext Time (p_c), s	0.7	3.7	0.2	2.0	0.0	15.1	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	56.5
HCM 6th LOS	E

HCM 6th TWSC

7: Harder Road & Dollar Street

Existing + Project
Timing Plan: PM

Intersection												
Int Delay, s/veh	98.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	77	837	121	85	591	20	143	13	101	35	4	131
Future Vol, veh/h	77	837	121	85	591	20	143	13	101	35	4	131
Conflicting Peds, #/hr	4	0	9	9	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	2	4	1	0	0	0	0	3	0	0
Mvmt Flow	82	890	129	90	629	21	152	14	107	37	4	139
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	654	0	0	1028	0	0	1626	1962	519	1440	2016	330
Stage 1	-	-	-	-	-	-	1128	1128	-	824	824	-
Stage 2	-	-	-	-	-	-	498	834	-	616	1192	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.5	6.5	6.9	7.56	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Follow-up Hdwy	2.2	-	-	2.24	-	-	3.5	4	3.3	3.53	4	3.3
Pot Cap-1 Maneuver	943	-	-	659	-	-	~ 69	64	507	93	59	672
Stage 1	-	-	-	-	-	-	221	282	-	331	390	-
Stage 2	-	-	-	-	-	-	528	386	-	442	263	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	939	-	-	653	-	-	~ 42	50	503	48	46	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 42	50	-	48	46	-
Stage 1	-	-	-	-	-	-	200	255	-	301	335	-
Stage 2	-	-	-	-	-	-	355	332	-	300	238	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.4			\$ 782			53.5		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	42 247		939	-	-	653	-	-	48	477		
HCM Lane V/C Ratio	3.622 0.491		0.087	-	-	0.138	-	-	0.776	0.301		
HCM Control Delay (s)	\$ 1379.1 32.9		9.2	-	-	11.4	-	-	199	15.8		
HCM Lane LOS	F D		A	-	-	B	-	-	F	C		
HCM 95th %tile Q(veh)	17.1 2.5		0.3	-	-	0.5	-	-	3.1	1.3		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 6th Signalized Intersection Summary8: Harder Road & Jane Avenue

Existing + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	348	727	24	65	800	216	21	25	29	113	36	237
Future Volume (veh/h)	348	727	24	65	800	216	21	25	29	113	36	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	391	817	27	73	899	243	24	28	33	127	40	266
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	2198	975	94	1670	732	132	162	212	264	70	342
Arrive On Green	0.40	1.00	1.00	0.05	0.47	0.47	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1795	3582	1588	1795	3582	1571	350	752	985	959	326	1586
Grp Volume(v), veh/h	391	817	27	73	899	243	34	0	51	167	0	266
Grp Sat Flow(s),veh/h/ln	1795	1791	1588	1795	1791	1571	557	0	1530	1285	0	1586
Q Serve(g_s), s	22.0	0.0	0.0	4.4	19.7	10.7	1.6	0.0	3.0	11.2	0.0	17.4
Cycle Q Clear(g_c), s	22.0	0.0	0.0	4.4	19.7	10.7	15.8	0.0	3.0	14.2	0.0	17.4
Prop In Lane	1.00		1.00	1.00		1.00	0.71		0.64	0.76		1.00
Lane Grp Cap(c), veh/h	359	2198	975	94	1670	732	176	0	330	335	0	342
V/C Ratio(X)	1.09	0.37	0.03	0.77	0.54	0.33	0.19	0.00	0.16	0.50	0.00	0.78
Avail Cap(c_a), veh/h	359	2198	975	196	1670	732	358	0	556	548	0	577
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	51.5	20.9	18.5	40.6	0.0	35.0	40.5	0.0	40.7
Incr Delay (d2), s/veh	63.0	0.3	0.0	12.6	1.2	1.2	0.5	0.0	0.2	1.2	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.5	0.1	0.0	2.3	8.2	4.0	0.9	0.0	1.1	4.3	0.0	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.0	0.3	0.0	64.0	22.2	19.8	41.1	0.0	35.2	41.7	0.0	44.5
LnGrp LOS	F	A	A	E	C	B	D	A	D	D	A	D
Approach Vol, veh/h	1235			1215			85			433		
Approach Delay, s/veh	30.6			24.2			37.6			43.4		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	72.5		27.7	26.0	56.3		27.7				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	22.0	35.0		40.0				
Max Q Clear Time (g_c+I1), s	6.4	2.0		19.4	24.0	21.7		17.8				
Green Ext Time (p_c), s	0.1	6.7		1.9	0.0	5.8		0.4				
Intersection Summary												
HCM 6th Ctrl Delay	30.0											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary

9: Harder Road & Soto Road

Existing + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	437	1179	150	27	811	179	128	74	17	107	61	343
Future Volume (veh/h)	437	1179	150	27	811	179	128	74	17	107	61	343
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	475	1282	163	29	882	195	139	80	18	116	66	373
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	473	1633	206	58	1009	433	141	487	110	442	80	453
Arrive On Green	0.26	0.51	0.51	0.03	0.28	0.28	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1795	3181	402	1795	3582	1538	956	1489	335	1304	245	1385
Grp Volume(v), veh/h	475	718	727	29	882	195	139	0	98	116	0	439
Grp Sat Flow(s), veh/h/ln	1795	1791	1792	1795	1791	1538	956	0	1823	1304	0	1630
Q Serve(g_s), s	29.0	35.8	36.5	1.7	25.8	11.5	8.7	0.0	4.2	7.6	0.0	27.3
Cycle Q Clear(g_c), s	29.0	35.8	36.5	1.7	25.8	11.5	36.0	0.0	4.2	11.8	0.0	27.3
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.18	1.00		0.85
Lane Grp Cap(c), veh/h	473	919	920	58	1009	433	141	0	597	442	0	533
V/C Ratio(X)	1.00	0.78	0.79	0.50	0.87	0.45	0.98	0.00	0.16	0.26	0.00	0.82
Avail Cap(c_a), veh/h	473	919	920	229	1009	433	141	0	597	442	0	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.75	0.75	0.75	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.5	21.7	21.9	52.4	37.6	32.5	52.6	0.0	26.3	30.5	0.0	34.1
Incr Delay (d2), s/veh	42.2	6.5	6.9	5.0	8.1	2.5	70.6	0.0	0.1	0.3	0.0	10.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	15.8	16.2	0.9	12.1	4.5	6.6	0.0	1.9	2.5	0.0	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.7	28.3	28.8	57.4	45.7	35.0	123.2	0.0	26.4	30.8	0.0	44.1
LnGrp LOS	F	C	C	E	D	D	F	A	C	C	A	D
Approach Vol, veh/h	1920			1106			237			555		
Approach Delay, s/veh	41.9			44.2			83.2			41.3		
Approach LOS	D			D			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	61.5		41.0	33.0	36.0		41.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0	46.0		36.0	29.0	31.0		36.0				
Max Q Clear Time (g_c+13), s	38.5	38.5		29.3	31.0	27.8		38.0				
Green Ext Time (p_c), s	0.0	5.1		2.0	0.0	1.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	45.1											
HCM 6th LOS	D											

HCM 6th TWSC

10: Mission Boulevard & North Driveway

Existing + Project
Timing Plan: PM

Intersection

Int Delay, s/veh 0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	14	0	2179	1679	16
Future Vol, veh/h	0	14	0	2179	1679	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	15	0	2294	1767	17

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 892	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.1	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.9	- -	- -
Pot Cap-1 Maneuver	0 248	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 248	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	20.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 248	- -	- -
HCM Lane V/C Ratio	- 0.059	- -	- -
HCM Control Delay (s)	- 20.4	- -	- -
HCM Lane LOS	- C	- -	- -
HCM 95th %tile Q(veh)	- 0.2	- -	- -

HCM 6th TWSC

11: Mission Boulevard & South Driveway

Existing + Project
Timing Plan: PM

Intersection

Int Delay, s/veh 0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	15	18	2171	1679	15
Future Vol, veh/h	0	15	18	2171	1679	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	16	19	2285	1767	16

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	892	1783
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	2.2
Pot Cap-1 Maneuver	0	289	353
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	289	353
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.2	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	353	-	289	-	-
HCM Lane V/C Ratio	0.054	-	0.055	-	-
HCM Control Delay (s)	15.8	-	18.2	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Existing Plus Project Queue Worksheets

Queues

Existing + Project

1: Mission Boulevard & Carlos Bee Boulevard

Timing Plan: AM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	212	371	395	477	300	66	1302	199	459	1673	174
v/c Ratio	0.67	0.66	0.91	0.69	0.57	0.50	0.62	0.26	0.77	0.63	0.21
Control Delay	73.4	57.7	86.7	58.3	12.0	75.0	35.3	4.7	64.9	26.5	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	57.7	86.7	58.3	12.0	75.0	35.3	4.7	64.9	26.5	10.2
Queue Length 50th (ft)	98	160	189	219	22	60	349	0	209	401	35
Queue Length 95th (ft)	143	203	#292	264	105	108	440	53	269	534	93
Internal Link Dist (ft)		743		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	341	893	434	1006	638	249	2085	767	600	2674	815
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.42	0.91	0.47	0.47	0.27	0.62	0.26	0.77	0.63	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Existing + Project

2: Mission Boulevard & Berry Avenue

Timing Plan: AM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	33	36	1446	42	2101
v/c Ratio	0.65	0.24	0.36	0.55	0.38	0.79
Control Delay	67.1	51.4	72.4	8.9	72.1	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	51.4	72.4	8.9	72.1	14.5
Queue Length 50th (ft)	72	22	32	264	38	556
Queue Length 95th (ft)	130	56	69	414	77	871
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	352	322	103	2652	113	2673
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.10	0.35	0.55	0.37	0.79
Intersection Summary						

Queues

Existing + Project

5: Mission Boulevard & Tennyson Road

Timing Plan: AM

										
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	385	4	282	16	2	222	1470	12	1898	274
v/c Ratio	0.68	0.01	0.57	0.17	0.01	0.45	0.42	0.14	0.68	0.29
Control Delay	58.7	43.2	9.7	65.1	0.0	57.0	12.0	64.5	24.5	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	43.2	9.7	65.1	0.0	57.0	12.0	64.5	24.5	9.2
Queue Length 50th (ft)	165	3	0	14	0	94	137	10	368	45
Queue Length 95th (ft)	203	13	72	39	0	136	345	31	577	128
Internal Link Dist (ft)	1876			1688			894		973	
Turn Bay Length (ft)	470	225			315	500	240			210
Base Capacity (vph)	839	455	600	442	454	492	3513	87	2807	940
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.01	0.47	0.04	0.00	0.45	0.42	0.14	0.68	0.29
Intersection Summary										

Queues

Existing + Project

6: Mission Boulevard & Harder Road

Timing Plan: AM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	363	412	414	202	136	40	291	1377	55	2033
v/c Ratio	0.51	0.61	0.85	0.58	0.50	0.19	1.00	0.62	0.21	0.96
Control Delay	51.2	54.8	37.6	67.5	67.5	2.0	109.2	31.3	53.2	51.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	54.8	37.6	67.5	67.5	2.0	109.2	31.3	53.2	51.5
Queue Length 50th (ft)	151	183	159	91	63	0	266	373	41	641
Queue Length 95th (ft)	189	206	242	#157	93	0	#425	372	87	#759
Internal Link Dist (ft)		322			2082			357		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	707	925	579	346	814	391	292	2562	269	2109
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.45	0.72	0.58	0.17	0.10	1.00	0.54	0.20	0.96

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

8: Jane Avenue & Harder Road

Existing + Project

Timing Plan: AM

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	228	858	4	24	711	162	145	211	367
v/c Ratio	0.75	0.39	0.00	0.21	0.42	0.19	0.20	0.75	0.57
Control Delay	59.0	14.4	0.0	52.5	22.2	4.4	17.7	54.1	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	14.4	0.0	52.5	22.2	4.4	17.7	54.1	6.6
Queue Length 50th (ft)	172	114	0	16	168	0	24	139	0
Queue Length 95th (ft)	252	234	m0	43	280	45	44	198	64
Internal Link Dist (ft)	1639			739			683	460	
Turn Bay Length (ft)	240				100				
Base Capacity (vph)	342	2211	986	194	1700	832	1091	439	805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.39	0.00	0.12	0.42	0.19	0.13	0.48	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: Soto Road & Harder Road

Existing + Project

Timing Plan: AM

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	301	1155	17	908	110	135	74	160	725
v/c Ratio	0.82	0.64	0.16	0.83	0.21	1.99	0.12	0.34	0.84
Control Delay	59.3	22.2	42.9	48.3	19.0	521.0	16.3	29.2	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	22.2	42.9	48.3	19.0	521.0	16.3	29.2	21.2
Queue Length 50th (ft)	202	263	13	203	0	~150	21	84	179
Queue Length 95th (ft)	276	392	m26	#419	78	#219	50	135	318
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	434	1795	193	1100	526	68	634	465	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.64	0.09	0.83	0.21	1.99	0.12	0.34	0.84

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Existing + Project

1: Mission Boulevard & Carlos Bee Boulevard

Timing Plan: PM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	386	190	284	360	88	1795	363	393	1415	177
v/c Ratio	0.61	0.73	0.71	0.47	0.76	0.59	0.71	0.40	0.77	0.49	0.20
Control Delay	81.4	66.2	81.9	57.3	28.9	80.6	32.0	8.5	71.3	21.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	66.2	81.9	57.3	28.9	80.6	32.0	8.5	71.3	21.3	5.9
Queue Length 50th (ft)	61	186	94	133	108	84	479	50	191	290	17
Queue Length 95th (ft)	97	228	138	168	217	141	651	149	241	409	67
Internal Link Dist (ft)		496		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	209	862	279	959	600	169	2522	917	559	2860	880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.45	0.68	0.30	0.60	0.52	0.71	0.40	0.70	0.49	0.20
Intersection Summary											

Queues

Existing + Project

2: Mission Boulevard & Berry Avenue

Timing Plan: PM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	25	52	2053	63	1526
v/c Ratio	0.50	0.27	0.45	0.71	0.49	0.53
Control Delay	61.3	58.5	87.9	23.8	79.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	58.5	87.9	23.8	79.3	6.9
Queue Length 50th (ft)	37	17	48	1038	60	254
Queue Length 95th (ft)	84	49	m67	1083	109	390
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	357	310	129	2907	134	2883
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.08	0.40	0.71	0.47	0.53

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Existing + Project

5: Mission Boulevard & Tennyson Road

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	372	5	256	28	3	392	1755	35	1248	341
v/c Ratio	0.69	0.02	0.55	0.19	0.01	0.32	0.55	0.35	0.78	0.52
Control Delay	67.0	50.2	10.3	63.7	0.0	40.9	21.7	78.6	51.9	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	50.2	10.3	63.7	0.0	40.9	21.7	78.6	51.9	15.3
Queue Length 50th (ft)	184	4	0	28	0	144	354	34	416	76
Queue Length 95th (ft)	223	17	78	52	0	#276	679	73	475	175
Internal Link Dist (ft)	1876		1698		1191		950			
Turn Bay Length (ft)	470	225		315		500		240		210
Base Capacity (vph)	852	462	585	454	451	1223	3189	128	1595	661
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.01	0.44	0.06	0.01	0.32	0.55	0.27	0.78	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Existing + Project

6: Mission Boulevard & Harder Road

Timing Plan: PM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	333	200	341	238	309	81	360	1942	57	1424
v/c Ratio	0.72	0.56	0.74	0.44	0.70	0.29	0.90	0.68	0.40	0.70
Control Delay	71.4	70.0	16.0	59.7	71.8	6.4	81.6	25.5	69.7	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.4	70.0	16.0	59.7	71.8	6.4	81.6	25.5	69.7	34.3
Queue Length 50th (ft)	163	100	0	110	155	0	338	526	0	424
Queue Length 95th (ft)	211	137	99	151	201	26	#490	596	106	540
Internal Link Dist (ft)		322			2082			387		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	471	810	617	542	770	412	440	2866	146	2042
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.25	0.55	0.44	0.40	0.20	0.82	0.68	0.39	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

8: Harder Road & Jane Avenue

Existing + Project

Timing Plan: PM

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	391	817	27	73	899	243	85	167	266
v/c Ratio	0.70	0.36	0.03	0.46	0.64	0.32	0.16	0.70	0.54
Control Delay	45.8	17.0	7.1	56.0	30.8	4.6	23.3	57.3	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	17.0	7.1	56.0	30.8	4.6	23.3	57.3	8.5
Queue Length 50th (ft)	295	168	1	50	260	0	16	113	0
Queue Length 95th (ft)	m380	241	m4	92	375	53	34	167	60
Internal Link Dist (ft)	1639			739			683	460	
Turn Bay Length (ft)	240				100				
Base Capacity (vph)	559	2267	993	199	1403	767	1065	491	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.36	0.03	0.37	0.64	0.32	0.08	0.34	0.36

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: Harder Road & Soto Road

Existing + Project

Timing Plan: PM



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	475	1445	29	882	195	139	98	116	439
v/c Ratio	0.97	0.78	0.24	0.88	0.35	1.04	0.17	0.28	0.62
Control Delay	74.6	26.3	38.9	62.5	23.8	125.7	24.3	29.9	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.6	26.3	38.9	62.5	23.8	125.7	24.3	29.9	15.3
Queue Length 50th (ft)	~341	455	21	273	38	97	43	60	90
Queue Length 95th (ft)	#554	#590	m35	#433	143	#229	84	108	198
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	490	1849	227	1007	559	139	604	425	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.78	0.13	0.88	0.35	1.00	0.16	0.27	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Existing Plus Project with Test Improvements LOS Worksheets

HCM 2010 TWSC

4: Mission Boulevard & Torrano Ave (S)

Existing + Project: Test Improvement

Timing Plan: AM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕		↕	↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	0	9	0	30	11	1334	16	37	1780	2
Future Vol, veh/h	0	0	0	9	0	30	11	1334	16	37	1780	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	0	10	0	32	12	1434	17	40	1914	2
Major/Minor	Minor2		Minor1				Major1			Major2		
Conflicting Flow All	2780	3502	994	2528	-	758	1938	0	0	1461	0	0
Stage 1	2017	2017	-	1477	-	-	-	-	-	-	-	-
Stage 2	763	1485	-	1051	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	-	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	-	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	9	6	247	14	0	354	307	-	-	469	-	-
Stage 1	62	104	-	135	0	-	-	-	-	-	-	-
Stage 2	367	190	-	246	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	5	239	12	-	343	301	-	-	465	-	-
Mov Cap-2 Maneuver	7	5	-	12	-	-	-	-	-	-	-	-
Stage 1	58	93	-	128	-	-	-	-	-	-	-	-
Stage 2	313	181	-	222	-	-	-	-	-	-	-	-
Approach	EB		WB				NB			SB		
HCM Control Delay, s	0		149.9				0.1			0.3		
HCM LOS	A		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	301	-	-	- 12 343	465	-	-					
HCM Lane V/C Ratio	0.039	-	-	- 0.806 0.094	0.086	-	-					
HCM Control Delay (s)	17.4	-	-	0\$ 594.3 16.6	13.5	-	-					
HCM Lane LOS	C	-	-	A F C	B	-	-					
HCM 95th %tile Q(veh)	0.1	-	-	- 1.8 0.3	0.3	-	-					

HCM 6th TWSC

4: Mission Boulevard & Torrano Avenue (S)

Existing + Project: Test Improvement

Timing Plan: PM

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	9	7	0	21	19	1954	37	76	1396	4
Future Vol, veh/h	2	0	9	7	0	21	19	1954	37	76	1396	4
Conflicting Peds, #/hr	4	0	8	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	0	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	0	9	7	0	22	20	2057	39	80	1469	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2704	3767	745	3020	-	1052	1473	0	0	2096	0	0
Stage 1	1631	1631	-	2117	-	-	-	-	-	-	-	-
Stage 2	1073	2136	-	903	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	-	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	-	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	10	4	361	~ 6	0	226	464	-	-	267	-	-
Stage 1	108	161	-	53	0	-	-	-	-	-	-	-
Stage 2	239	90	-	303	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	3	358	~ 4	-	225	464	-	-	267	-	-
Mov Cap-2 Maneuver	7	3	-	~ 4	-	-	-	-	-	-	-	-
Stage 1	103	113	-	51	-	-	-	-	-	-	-	-
Stage 2	205	86	-	205	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	134.2		\$ 511.7		0.1		1.2					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	464	-	-	7	358	4	225	267	-	-		
HCM Lane V/C Ratio	0.043	-	-	0.301	0.026	1.842	0.098	0.3	-	-		
HCM Control Delay (s)	13.1	-	-	\$ 669.1	15.3	\$ 1978.8	22.7	24.1	-	-		
HCM Lane LOS	B	-	-	F	C	F	C	C	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	1.9	0.3	1.2	-	-		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Existing Plus Project Peak Hour Signal Warrants



KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
EIR\analysis\signal warrants\Mission&Torrano
S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Existing + Project AM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
8:00 AM	9:00 AM	1370	1828	0	39
2nd Highest Hour		1297	1731	0	35
3rd Highest Hour		1279	1706	0	30
4th Highest Hour		1224	1633	0	30
5th Highest Hour		1206	1609	0	26
6th Highest Hour		1206	1609	0	26
7th Highest Hour		1151	1536	0	25
8th Highest Hour		1133	1511	0	23
9th Highest Hour		1096	1462	0	22
10th Highest Hour		1023	1365	0	21
11th Highest Hour		986	1316	0	21
12th Highest Hour		968	1292	0	21
13th Highest Hour		932	1243	0	20
14th Highest Hour		804	1072	0	17
15th Highest Hour		639	853	0	16
16th Highest Hour		603	804	0	12
17th Highest Hour		420	561	0	12
18th Highest Hour		347	463	0	8
19th Highest Hour		183	244	0	5
20th Highest Hour		128	171	0	4
21st Highest Hour		110	146	0	2
22nd Highest Hour		73	97	0	2
23rd Highest Hour		37	49	0	2
24th Highest Hour		37	49	0	1

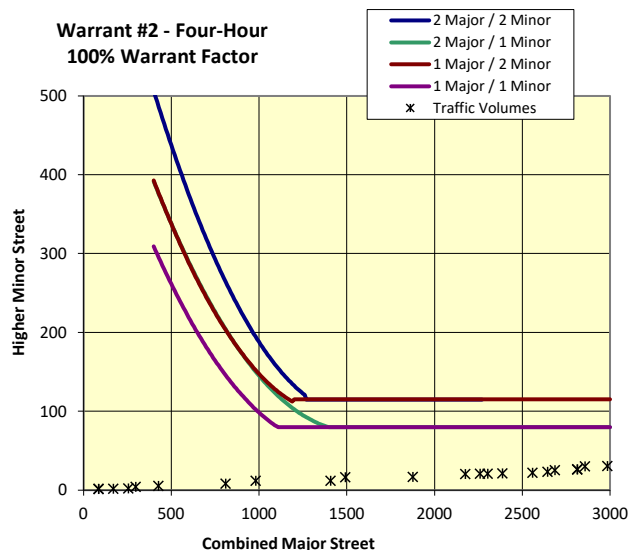
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

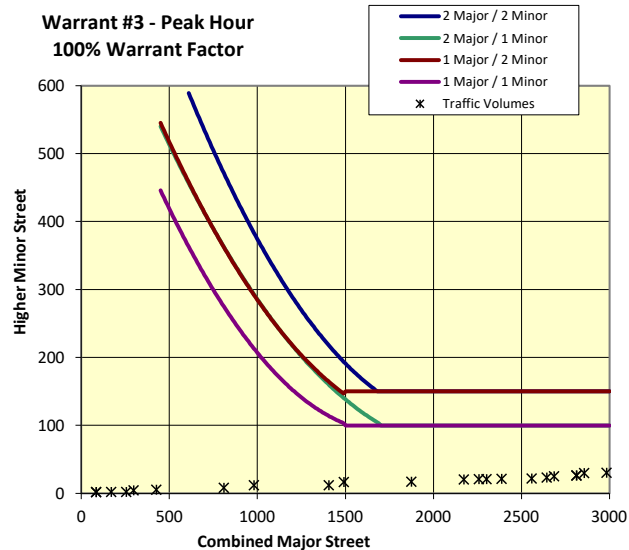
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Mission&Torrano
 S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Existing + Project PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

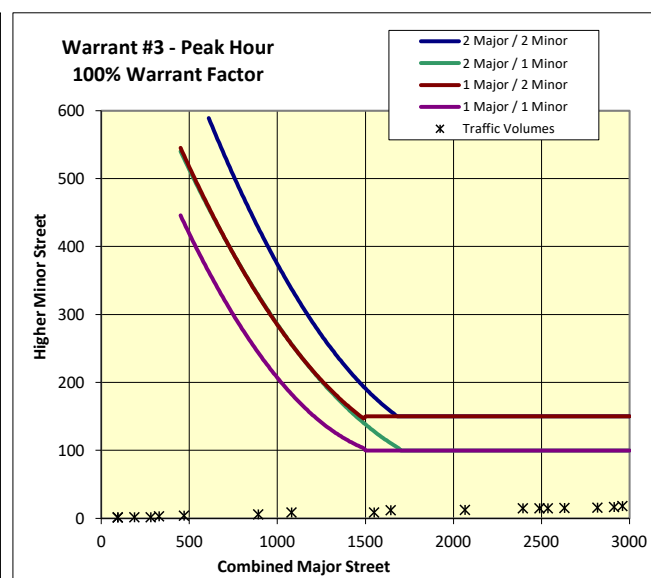
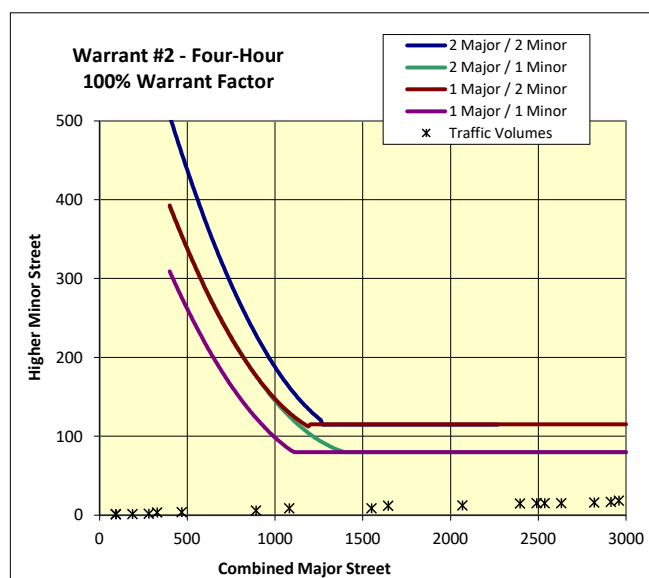
Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
5:00 PM	6:00 PM	2030	1494	11	28
2nd Highest Hour		1922	1414	10	25
3rd Highest Hour		1895	1394	9	22
4th Highest Hour		1813	1335	8	21
5th Highest Hour		1786	1315	7	19
6th Highest Hour		1786	1315	7	19
7th Highest Hour		1705	1255	7	18
8th Highest Hour		1678	1235	7	17
9th Highest Hour		1624	1195	6	16
10th Highest Hour		1516	1116	6	15
11th Highest Hour		1462	1076	6	15
12th Highest Hour		1435	1056	6	15
13th Highest Hour		1380	1016	6	14
14th Highest Hour		1191	876	5	12
15th Highest Hour		947	697	5	12
16th Highest Hour		893	657	3	8
17th Highest Hour		623	458	3	8
18th Highest Hour		514	378	2	6
19th Highest Hour		271	199	1	4
20th Highest Hour		189	139	1	3
21st Highest Hour		162	120	1	2
22nd Highest Hour		108	80	0	1
23rd Highest Hour		54	40	0	1
24th Highest Hour		54	40	0	1

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Harder Road & Dollar Street
Intersection: Harder Road & Dollar Street
Scenario: Existing + Project AM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:00 AM	8:00 AM	991	609	175	219
2nd Highest Hour		938	577	156	195
3rd Highest Hour		925	568	135	170
4th Highest Hour		885	544	134	167
5th Highest Hour		872	536	119	148
6th Highest Hour		872	536	117	146
7th Highest Hour		832	512	113	141
8th Highest Hour		819	503	103	130
9th Highest Hour		793	487	98	122
10th Highest Hour		740	455	94	118
11th Highest Hour		714	438	92	115
12th Highest Hour		700	430	92	115
13th Highest Hour		674	414	90	113
14th Highest Hour		581	357	75	94
15th Highest Hour		462	284	73	92
16th Highest Hour		436	268	53	66
17th Highest Hour		304	187	53	66
18th Highest Hour		251	154	36	45
19th Highest Hour		132	81	23	28
20th Highest Hour		92	57	19	24
21st Highest Hour		79	49	9	12
22nd Highest Hour		53	32	8	9
23rd Highest Hour		26	16	8	9
24th Highest Hour		26	16	6	7

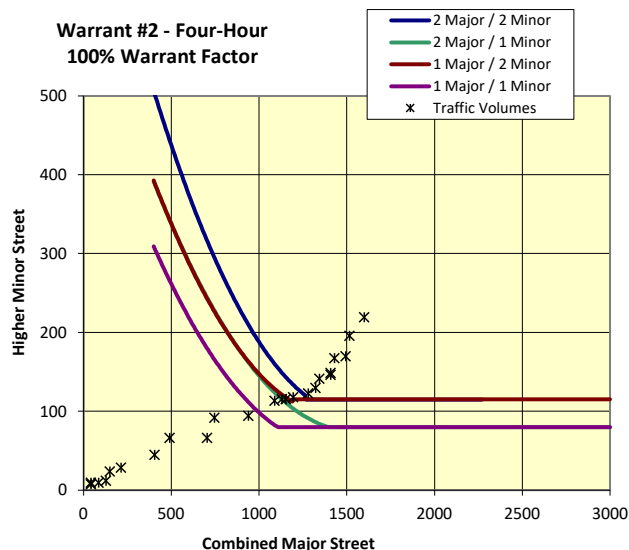
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

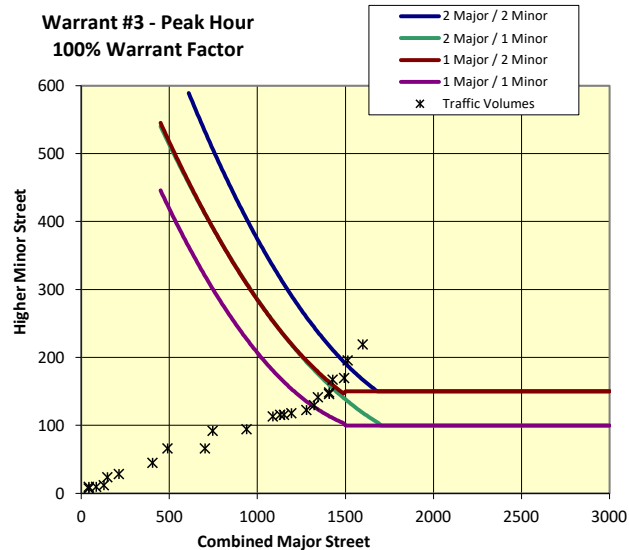
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	4	No	Yes
	B	900	75	14	Yes	
80%	A	480	120	9	Yes	Yes
	B	720	60	15	Yes	
70%	A	420	105	13	Yes	Yes
	B	630	53	16	Yes	
56%	A	336	84	15	Yes	Yes
	B	504	42	16	Yes	

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541_Signal-Harder Road & Dollar Street
Intersection: Harder Road & Dollar Street
Scenario: Existing + Project PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	1061	716	250	173
2nd Highest Hour		1004	678	223	154
3rd Highest Hour		990	668	194	134
4th Highest Hour		948	640	191	132
5th Highest Hour		934	630	169	117
6th Highest Hour		934	630	167	115
7th Highest Hour		891	601	161	112
8th Highest Hour		877	592	148	102
9th Highest Hour		849	573	140	97
10th Highest Hour		792	535	134	93
11th Highest Hour		764	516	132	91
12th Highest Hour		750	506	132	91
13th Highest Hour		721	487	129	89
14th Highest Hour		622	420	108	74
15th Highest Hour		495	334	105	73
16th Highest Hour		467	315	75	52
17th Highest Hour		325	220	75	52
18th Highest Hour		269	181	51	35
19th Highest Hour		141	95	32	22
20th Highest Hour		99	67	27	19
21st Highest Hour		85	57	13	9
22nd Highest Hour		57	38	11	7
23rd Highest Hour		28	19	11	7
24th Highest Hour		28	19	8	6

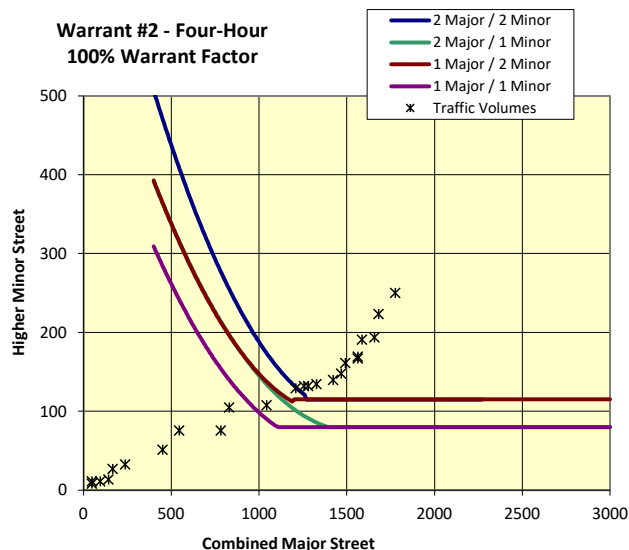
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

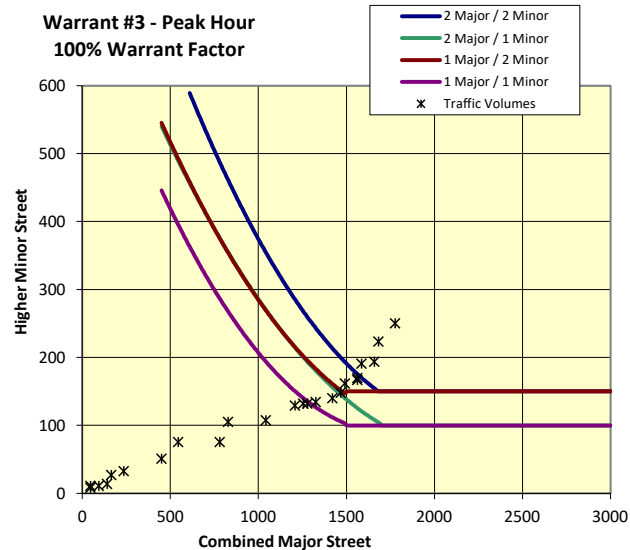
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	7	No	Yes
	B	900	75	14	Yes	
80%	A	480	120	13	Yes	Yes
	B	720	60	16	Yes	
70%	A	420	105	15	Yes	Yes
	B	630	53	16	Yes	
56%	A	336	84	15	Yes	Yes
	B	504	42	17	Yes	

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor



Appendix 5 Cumulative 2040 Level of
Service, Queue, and Peak
Hour Traffic Signal Warrant
Worksheets

Cumulative 2040 Level of Service Worksheets

HCM 6th Signalized Intersection Summary

1: Mission Boulevard & Carlos Bee Boulevard

Cumulative
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	314	325	100	379	712	279	138	1712	181	422	2524	422
Future Volume (veh/h)	314	325	100	379	712	279	138	1712	181	422	2524	422
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	341	353	109	412	774	303	150	1861	197	459	2743	459
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	368	671	204	343	865	383	113	2025	631	442	2363	691
Arrive On Green	0.11	0.25	0.25	0.10	0.24	0.24	0.06	0.40	0.40	0.13	0.47	0.47
Sat Flow, veh/h	3483	2701	822	3483	3582	1588	1781	5025	1566	3483	5066	1481
Grp Volume(v), veh/h	341	232	230	412	774	303	150	1861	197	459	2743	459
Grp Sat Flow(s),veh/h/ln	1742	1791	1731	1742	1791	1588	1781	1675	1566	1742	1689	1481
Q Serve(g_s), s	13.8	15.9	16.3	14.0	29.7	25.4	9.0	49.9	12.2	18.0	66.2	34.0
Cycle Q Clear(g_c), s	13.8	15.9	16.3	14.0	29.7	25.4	9.0	49.9	12.2	18.0	66.2	34.0
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	368	445	430	343	865	383	113	2025	631	442	2363	691
V/C Ratio(X)	0.93	0.52	0.53	1.20	0.90	0.79	1.33	0.92	0.31	1.04	1.16	0.66
Avail Cap(c_a), veh/h	368	467	451	343	908	403	113	2025	631	442	2363	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	46.1	46.2	64.0	52.1	50.5	66.5	40.2	28.9	62.0	37.9	29.3
Incr Delay (d2), s/veh	29.1	1.0	1.1	114.6	11.1	9.8	196.4	8.2	1.3	53.5	77.6	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	7.3	7.3	11.7	14.7	11.3	10.2	21.7	4.9	11.2	43.4	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.1	47.0	47.3	178.6	63.2	60.3	262.9	48.4	30.2	115.5	115.5	34.3
LnGrp LOS	F	D	D	F	E	E	F	D	C	F	F	C
Approach Vol, veh/h		803			1489			2208			3661	
Approach Delay, s/veh		66.2			94.5			61.4			105.3	
Approach LOS		E			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	71.2	19.0	38.8	22.0	62.2	18.0	39.8				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	9.0	64.5	15.0	36.0	18.0	55.5	14.0	37.0				
Max Q Clear Time (g_c+I1), s	11.0	68.2	15.8	31.7	20.0	51.9	16.0	18.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.4	0.0	3.2	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay			87.6									
HCM 6th LOS			F									

HCM 6th Signalized Intersection Summary

2: Mission Boulevard & Berry Avenue

Cumulative
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	158	4	35	70	2	57	33	1771	4	41	2839	75
Future Volume (veh/h)	158	4	35	70	2	57	33	1771	4	41	2839	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1811	1841	1841	1900	1856	1856
Adj Flow Rate, veh/h	172	4	38	76	2	62	36	1925	4	45	3086	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	6	4	4	0	3	3
Cap, veh/h	253	5	46	200	16	140	51	2442	5	58	2401	63
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.03	0.68	0.68	0.03	0.68	0.68
Sat Flow, veh/h	1071	25	237	829	82	724	1725	3580	7	1810	3506	93
Grp Volume(v), veh/h	214	0	0	140	0	0	36	940	989	45	1543	1625
Grp Sat Flow(s), veh/h/ln	1333	0	0	1636	0	0	1725	1749	1839	1810	1763	1836
Q Serve(g_s), s	11.7	0.0	0.0	0.0	0.0	0.0	2.9	52.1	52.2	3.5	96.5	96.5
Cycle Q Clear(g_c), s	22.0	0.0	0.0	10.3	0.0	0.0	2.9	52.1	52.2	3.5	96.5	96.5
Prop In Lane	0.80		0.18	0.54		0.44	1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	304	0	0	356	0	0	51	1192	1254	58	1207	1257
V/C Ratio(X)	0.70	0.00	0.00	0.39	0.00	0.00	0.71	0.79	0.79	0.77	1.28	1.29
Avail Cap(c_a), veh/h	360	0	0	415	0	0	73	1192	1254	77	1207	1257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	0.0	0.0	50.0	0.0	0.0	67.8	15.4	15.4	67.7	22.2	22.2
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.7	0.0	0.0	16.5	5.3	5.1	28.2	131.9	137.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.0	4.5	0.0	0.0	1.5	20.8	21.8	2.1	79.6	84.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	0.0	0.0	50.7	0.0	0.0	84.3	20.7	20.5	95.9	154.1	159.8
LnGrp LOS	E	A	A	D	A	A	F	C	C	F	F	F
Approach Vol, veh/h	214			140			1965			3213		
Approach Delay, s/veh	60.0			50.7			21.8			156.2		
Approach LOS	E			D			C			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	101.5		31.3	8.6	101.2		31.3				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	6.0	89.0		33.0	6.0	89.0		33.0				
Max Q Clear Time (g_c+14.5), s	14.5	98.5		12.3	5.5	54.2		24.0				
Green Ext Time (p_c), s	0.0	0.0		0.8	0.0	21.1		0.8				
Intersection Summary												
HCM 6th Ctrl Delay	102.0											
HCM 6th LOS	F											

HCM 6th TWSC

3: Mission Boulevard & Torrano Avenue (N)

Cumulative
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↗↗	↗↗	
Traffic Vol, veh/h	0	25	0	1762	2758	122
Future Vol, veh/h	0	25	0	1762	2758	122
Conflicting Peds, #/hr	0	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	4	3	3
Mvmt Flow	0	27	0	1895	2966	131
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1551	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	105	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	105	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	50.7	0		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 105		-	-		
HCM Lane V/C Ratio	- 0.256		-	-		
HCM Control Delay (s)	- 50.7		-	-		
HCM Lane LOS	- F		-	-		
HCM 95th %tile Q(veh)	- 0.9		-	-		

HCM 6th TWSC

4: Mission Boulevard & Torrano Avenue (S)

Cumulative
Timing Plan: AM

Intersection												
Int Delay, s/veh	50.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	1	9	0	30	14	1747	22	85	2752	2
Future Vol, veh/h	0	0	1	9	0	30	14	1747	22	85	2752	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	1	10	0	32	15	1878	24	91	2959	2

Major/Minor	Minor2		Minor1				Major1			Major2		
Conflicting Flow All	4155	5106	1517	3606	5095	983	2983	0	0	1912	0	0
Stage 1	3164	3164	-	1930	1930	-	-	-	-	-	-	-
Stage 2	991	1942	-	1676	3165	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	1	1	110	~ 2	1	252	119	-	-	314	-	-
Stage 1	11	26	-	70	115	-	-	-	-	-	-	-
Stage 2	268	113	-	101	26	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1	1	106	~ 1	1	244	117	-	-	311	-	-
Mov Cap-2 Maneuver	1	1	-	~ 1	1	-	-	-	-	-	-	-
Stage 1	9	18	-	60	99	-	-	-	-	-	-	-
Stage 2	199	98	-	70	18	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	39.3	\$ 6005.2	0.3	0.6
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	117	-	-	106	4	311	-
HCM Lane V/C Ratio	0.129	-	-	0.01	10.484	0.294	-
HCM Control Delay (s)	40.3	-	-	39.3	\$ 6005.2	21.3	-
HCM Lane LOS	E	-	-	E	F	C	-
HCM 95th %tile Q(veh)	0.4	-	-	0	7	1.2	-

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary

5: Mission Boulevard & Tennyson Road

Cumulative
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	714	21	512	82	103	12	338	1302	2	43	2427	652
Future Volume (veh/h)	714	21	512	82	103	12	338	1302	2	43	2427	652
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	802	24	575	92	116	13	380	1463	2	48	2727	733
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	845	457	387	108	137	212	154	2376	3	66	2266	704
Arrive On Green	0.24	0.24	0.24	0.13	0.13	0.13	0.04	0.45	0.45	0.04	0.44	0.44
Sat Flow, veh/h	3456	1870	1585	809	1021	1585	3456	5266	7	1781	5106	1585
Grp Volume(v), veh/h	802	24	575	208	0	13	380	946	519	48	2727	733
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1830	0	1585	1728	1702	1869	1781	1702	1585
Q Serve(g_s), s	30.8	1.3	33.0	15.0	0.0	1.0	6.0	28.5	28.5	3.6	59.9	59.9
Cycle Q Clear(g_c), s	30.8	1.3	33.0	15.0	0.0	1.0	6.0	28.5	28.5	3.6	59.9	59.9
Prop In Lane	1.00		1.00	0.44		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	845	457	387	245	0	212	154	1536	843	66	2266	704
V/C Ratio(X)	0.95	0.05	1.48	0.85	0.00	0.06	2.47	0.62	0.62	0.73	1.20	1.04
Avail Cap(c_a), veh/h	845	457	387	447	0	387	154	1536	843	79	2266	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	39.0	51.0	57.1	0.0	51.1	64.5	28.1	28.1	64.3	37.5	37.5
Incr Delay (d2), s/veh	19.7	0.0	231.2	8.0	0.0	0.1	682.5	1.9	3.4	23.3	95.9	45.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	0.6	38.0	7.5	0.0	0.4	17.2	11.7	13.2	2.1	44.2	31.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.9	39.1	282.2	65.1	0.0	51.2	747.0	30.0	31.5	87.6	133.5	82.8
LnGrp LOS	E	D	F	E	A	D	F	C	C	F	F	F
Approach Vol, veh/h	1401			221			1845			3508		
Approach Delay, s/veh	156.5			64.3			178.1			122.3		
Approach LOS	F			E			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	64.9		22.1	9.0	65.9		38.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	6.0	45.0		33.0	6.0	45.0		33.0				
Max Q Clear Time (g_c+I1), s	8.0	61.9		17.0	5.6	30.5		35.0				
Green Ext Time (p_c), s	0.0	0.0		1.1	0.0	8.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	142.1											
HCM 6th LOS	F											

HCM 6th Signalized Intersection Summary

6: Mission Boulevard & Harder Road

Cumulative
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔↔	↑↑↑		↗↑↑↑		
Traffic Volume (veh/h)	385	350	493	238	172	69	273	1214	170	47	2595	181
Future Volume (veh/h)	385	350	493	238	172	69	273	1214	170	47	2595	181
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1885	1856	1900	1870	1589	1870	1841	1841	1841	1856	1856
Adj Flow Rate, veh/h	448	407	573	277	200	80	317	1412	198	55	3017	210
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	4	1	3	0	2	21	2	4	4	4	3	3
Cap, veh/h	676	902	388	227	419	154	192	1747	245	295	2193	149
Arrive On Green	0.20	0.25	0.25	0.06	0.12	0.12	0.11	0.39	0.39	0.17	0.45	0.45
Sat Flow, veh/h	3401	3582	1539	3510	3554	1304	1781	4444	623	1753	4839	329
Grp Volume(v), veh/h	448	407	573	277	200	80	317	1064	546	55	2083	1144
Grp Sat Flow(s),veh/h/ln	1700	1791	1539	1755	1777	1304	1781	1675	1716	1753	1689	1790
Q Serve(g_s), s	16.9	13.3	35.0	9.0	7.3	8.0	15.0	39.3	39.3	3.7	63.0	63.0
Cycle Q Clear(g_c), s	16.9	13.3	35.0	9.0	7.3	8.0	15.0	39.3	39.3	3.7	63.0	63.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		0.18
Lane Grp Cap(c), veh/h	676	902	388	227	419	154	192	1317	675	295	1531	811
V/C Ratio(X)	0.66	0.45	1.48	1.22	0.48	0.52	1.65	0.81	0.81	0.19	1.36	1.41
Avail Cap(c_a), veh/h	676	902	388	227	818	300	192	1639	840	295	1531	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	43.9	52.0	65.0	57.3	57.6	62.0	37.5	37.5	49.7	38.0	38.0
Incr Delay (d2), s/veh	2.4	0.4	228.7	131.4	0.8	2.7	314.2	5.4	10.1	0.3	166.6	192.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	6.0	38.0	8.2	3.3	2.8	23.5	16.8	18.2	1.7	60.6	70.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.8	44.2	280.7	196.4	58.1	60.3	376.2	42.9	47.6	50.0	204.6	230.0
LnGrp LOS	D	D	F	F	E	E	F	D	D	D	F	F
Approach Vol, veh/h	1428			557			1927			3282		
Approach Delay, s/veh	142.1			127.2			99.1			210.9		
Approach LOS	F			F			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), \$9.0	68.0	31.6	20.4	27.4	59.6	13.0	39.0					
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	63.0	12.0	32.0	10.0	68.0	9.0	35.0				
Max Q Clear Time (g_c+I1), s	11.0	65.0	18.9	10.0	5.7	41.3	11.0	37.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	13.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	160.8
HCM 6th LOS	F

HCM 6th TWSC

7: Dollar Street & Harder Road

Cumulative
Timing Plan: AM

Intersection												
Int Delay, s/veh	22.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	1065	70	15	570	19	40	6	15	34	11	196
Future Vol, veh/h	60	1065	70	15	570	19	40	6	15	34	11	196
Conflicting Peds, #/hr	6	0	10	10	0	6	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	6	3	0	0	4	0	0	20	0	9	0	3
Mvmt Flow	70	1238	81	17	663	22	47	7	17	40	13	228

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	1329	0	0	1803	2154	670	1477	2183	351
Stage 1	-	-	-	-	-	-	1429	1429	-	714	714	-
Stage 2	-	-	-	-	-	-	374	725	-	763	1469	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.5	6.9	6.9	7.68	6.5	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.5	4.2	3.3	3.59	4	3.33
Pot Cap-1 Maneuver	873	-	-	526	-	-	51	38	404	82	47	642
Stage 1	-	-	-	-	-	-	144	169	-	373	438	-
Stage 2	-	-	-	-	-	-	624	387	-	348	194	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	868	-	-	521	-	-	~ 23	33	400	60	41	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 23	33	-	60	41	-
Stage 1	-	-	-	-	-	-	131	154	-	341	421	-
Stage 2	-	-	-	-	-	-	375	372	-	292	177	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	\$ 565.4	48.6
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	23	96	868	-	-	521	-	-	60	359
HCM Lane V/C Ratio	2.022	0.254	0.08	-	-	0.033	-	-	0.659	0.67
HCM Control Delay (s)	\$ 833.5	54.8	9.5	-	-	12.1	-	-	142.1	33.2
HCM Lane LOS	F	F	A	-	-	B	-	-	F	D
HCM 95th %tile Q(veh)	5.9	0.9	0.3	-	-	0.1	-	-	2.8	4.6

Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon									

HCM 6th Signalized Intersection Summary8: Jane Avenue & Harder Road

Cumulative
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	930	4	19	636	146	27	49	54	190	19	338
Future Volume (veh/h)	223	930	4	19	636	146	27	49	54	190	19	338
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	242	1011	4	21	691	159	29	53	59	207	21	367
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	272	2133	949	31	1653	727	96	202	266	330	27	428
Arrive On Green	0.20	0.79	0.79	0.02	0.46	0.46	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	3582	1594	1795	3582	1575	165	751	989	996	101	1590
Grp Volume(v), veh/h	242	1011	4	21	691	159	50	0	91	228	0	367
Grp Sat Flow(s),veh/h/ln	1795	1791	1594	1795	1791	1575	373	0	1532	1097	0	1590
Q Serve(g_s), s	14.4	10.3	0.1	1.3	14.2	6.7	2.0	0.0	5.1	17.8	0.0	24.1
Cycle Q Clear(g_c), s	14.4	10.3	0.1	1.3	14.2	6.7	24.9	0.0	5.1	22.9	0.0	24.1
Prop In Lane	1.00		1.00	1.00		1.00	0.58		0.65	0.91		1.00
Lane Grp Cap(c), veh/h	272	2133	949	31	1653	727	152	0	412	358	0	428
V/C Ratio(X)	0.89	0.47	0.00	0.68	0.42	0.22	0.33	0.00	0.22	0.64	0.00	0.86
Avail Cap(c_a), veh/h	326	2133	949	196	1653	727	270	0	557	483	0	578
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.75	0.75	0.75	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.0	5.7	4.6	53.8	19.8	17.7	38.1	0.0	31.3	40.1	0.0	38.2
Incr Delay (d2), s/veh	17.7	0.6	0.0	23.0	0.8	0.7	1.2	0.0	0.3	1.9	0.0	9.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	3.0	0.0	0.8	5.9	2.5	1.4	0.0	1.9	6.0	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	6.3	4.6	76.7	20.5	18.4	39.3	0.0	31.5	42.0	0.0	47.6
LnGrp LOS	E	A	A	E	C	B	D	A	C	D	A	D
Approach Vol, veh/h		1257			871			141			595	
Approach Delay, s/veh		16.7			21.5			34.3			45.5	
Approach LOS		B			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	70.5		33.6	20.7	55.8		33.6				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	20.0	37.0		40.0				
Max Q Clear Time (g_c+I1), s	3.3	12.3		26.1	16.4	16.2		26.9				
Green Ext Time (p_c), s	0.0	8.4		2.5	0.2	5.2		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			25.0									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Cumulative
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	259	949	71	14	886	141	116	38	26	154	30	593
Future Volume (veh/h)	259	949	71	14	886	141	116	38	26	154	30	593
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	1103	83	16	1030	164	135	44	30	179	35	690
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1688	127	38	1206	510	65	358	244	484	27	524
Arrive On Green	0.19	0.51	0.51	0.03	0.45	0.45	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	3334	251	1781	3554	1503	729	1035	706	1323	77	1516
Grp Volume(v), veh/h	301	587	599	16	1030	164	135	0	74	179	0	725
Grp Sat Flow(s), veh/h/ln	1781	1777	1808	1781	1777	1503	729	0	1741	1323	0	1593
Q Serve(g_s), s	18.2	26.8	26.9	1.0	28.5	7.7	0.0	0.0	3.2	11.8	0.0	38.0
Cycle Q Clear(g_c), s	18.2	26.8	26.9	1.0	28.5	7.7	38.0	0.0	3.2	15.0	0.0	38.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.41	1.00		0.95
Lane Grp Cap(c), veh/h	335	899	915	38	1206	510	65	0	601	484	0	550
V/C Ratio(X)	0.90	0.65	0.65	0.43	0.85	0.32	2.06	0.00	0.12	0.37	0.00	1.32
Avail Cap(c_a), veh/h	437	899	915	194	1206	510	65	0	601	484	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.6	20.0	20.1	52.8	27.7	22.1	55.0	0.0	24.6	29.7	0.0	36.0
Incr Delay (d2), s/veh	17.7	3.7	3.6	6.6	7.0	1.5	526.6	0.0	0.1	0.5	0.0	155.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	11.4	11.6	0.5	11.7	2.8	11.4	0.0	1.4	3.8	0.0	38.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.3	23.7	23.7	59.4	34.7	23.5	581.6	0.0	24.7	30.2	0.0	191.4
LnGrp LOS	E	C	C	E	C	C	F	A	C	C	A	F
Approach Vol, veh/h	1487			1210			209			904		
Approach Delay, s/veh	31.3			33.5			384.4			159.5		
Approach LOS	C			C			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	60.7			43.0	24.7	42.3		43.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0			38.0	27.0	31.0		38.0				
Max Q Clear Time (g_c+13), s	28.9			40.0	20.2	30.5		40.0				
Green Ext Time (p_c), s	0.0	7.4		0.0	0.5	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	81.8											
HCM 6th LOS	F											

HCM 6th TWSC

10: Mission Boulevard & North Driveway

Cumulative
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	0	0	1603	3327	0
Future Vol, veh/h	0	0	0	1603	3327	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	0	0	1864	3869	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	1935	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	49	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	49	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	-	-	-		
HCM Lane V/C Ratio	-	-	-	-		
HCM Control Delay (s)	-	0	-	-		
HCM Lane LOS	-	A	-	-		
HCM 95th %tile Q(veh)	-	-	-	-		

HCM 6th TWSC

11: Mission Boulevard & South Driveway

Cumulative
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1603	3327	0
Future Vol, veh/h	0	0	0	1603	3327	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	0	0	1864	3869	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1935	3869	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	57	52	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	57	52	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	52	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	0	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	-	-	-	

HCM 6th Signalized Intersection Summary

1: Mision Boulevard & Carlos Bee Boulevard

Cumulative
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	786	688	203	174	261	412	88	2054	332	522	1888	483
Future Volume (veh/h)	786	688	203	174	261	412	88	2054	332	522	1888	483
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	854	748	221	189	284	448	96	2233	361	567	2052	525
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	584	913	270	234	841	373	96	1838	572	397	2159	631
Arrive On Green	0.17	0.34	0.34	0.07	0.23	0.23	0.05	0.37	0.37	0.11	0.43	0.43
Sat Flow, veh/h	3483	2723	804	3483	3582	1587	1781	5025	1565	3483	5066	1480
Grp Volume(v), veh/h	854	492	477	189	284	448	96	2233	361	567	2052	525
Grp Sat Flow(s),veh/h/ln	1742	1791	1736	1742	1791	1587	1781	1675	1565	1742	1689	1480
Q Serve(g_s), s	25.0	37.5	37.5	8.0	9.8	35.0	8.0	54.5	28.3	17.0	58.2	47.0
Cycle Q Clear(g_c), s	25.0	37.5	37.5	8.0	9.8	35.0	8.0	54.5	28.3	17.0	58.2	47.0
Prop In Lane	1.00		0.46	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	584	601	582	234	841	373	96	1838	572	397	2159	631
V/C Ratio(X)	1.46	0.82	0.82	0.81	0.34	1.20	1.00	1.21	0.63	1.43	0.95	0.83
Avail Cap(c_a), veh/h	584	601	582	257	841	373	96	1838	572	397	2159	631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.0	45.4	45.4	68.5	47.4	57.0	70.5	47.3	39.0	66.0	41.2	38.0
Incr Delay (d2), s/veh	216.9	8.8	9.0	15.8	0.2	113.6	93.1	101.9	5.2	206.2	10.8	12.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.8	18.3	17.8	4.1	4.5	25.9	6.1	39.7	11.9	18.9	25.9	19.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	278.9	54.2	54.4	84.3	47.6	170.6	163.6	149.2	44.2	272.2	52.0	50.2
LnGrp LOS	F	D	D	F	D	F	F	F	D	F	D	D
Approach Vol, veh/h		1823			921			2690			3144	
Approach Delay, s/veh		159.5			115.0			135.6			91.4	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	68.5	29.0	39.5	21.0	59.5	14.0	54.5				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	8.0	63.5	25.0	35.0	17.0	54.5	11.0	49.0				
Max Q Clear Time (g_c+I1), s	10.0	60.2	27.0	37.0	19.0	56.5	10.0	39.5				
Green Ext Time (p_c), s	0.0	3.1	0.0	0.0	0.0	0.0	0.1	4.5				
Intersection Summary												
HCM 6th Ctrl Delay			122.3									
HCM 6th LOS			F									

HCM 6th Signalized Intersection Summary

2: Mision Boulevard & Berry Avenue

Cumulative
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	37	3	21	39	4	26	86	2159	6	63	1854	105
Future Volume (veh/h)	37	3	21	39	4	26	86	2159	6	63	1854	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	38	3	22	40	4	27	89	2226	6	65	1911	108
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	1	1	0	2	2
Cap, veh/h	96	14	39	93	14	42	108	2930	8	83	2681	150
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.12	1.00	1.00	0.05	0.78	0.78
Sat Flow, veh/h	850	207	567	818	201	625	1781	3664	10	1810	3417	191
Grp Volume(v), veh/h	63	0	0	71	0	0	89	1087	1145	65	984	1035
Grp Sat Flow(s), veh/h/ln	1625	0	0	1644	0	0	1781	1791	1883	1810	1777	1831
Q Serve(g_s), s	0.0	0.0	0.0	0.6	0.0	0.0	7.3	0.0	0.0	5.3	40.0	42.0
Cycle Q Clear(g_c), s	5.3	0.0	0.0	5.9	0.0	0.0	7.3	0.0	0.0	5.3	40.0	42.0
Prop In Lane	0.60		0.35	0.56		0.38	1.00		0.01	1.00		0.10
Lane Grp Cap(c), veh/h	149	0	0	149	0	0	108	1432	1506	83	1394	1437
V/C Ratio(X)	0.42	0.00	0.00	0.48	0.00	0.00	0.82	0.76	0.76	0.79	0.71	0.72
Avail Cap(c_a), veh/h	373	0	0	375	0	0	119	1432	1506	109	1394	1437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.6	0.0	0.0	67.9	0.0	0.0	65.1	0.0	0.0	70.8	7.8	8.0
Incr Delay (d2), s/veh	1.9	0.0	0.0	2.3	0.0	0.0	33.3	3.8	3.7	23.7	3.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	2.8	0.0	0.0	4.2	1.5	1.5	3.0	14.6	15.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.5	0.0	0.0	70.2	0.0	0.0	98.4	3.8	3.7	94.6	10.8	11.2
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	B	B
Approach Vol, veh/h		63			71			2321			2084	
Approach Delay, s/veh		69.5			70.2			7.4			13.6	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	3.1	122.7		14.2	10.9	125.0		14.2				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	94.0			33.0	9.0	95.0		33.0				
Max Q Clear Time (g_c+1), s	44.0			7.9	7.3	2.0		7.3				
Green Ext Time (p_c), s	0.0	29.7		0.3	0.0	51.2		0.3				

Intersection Summary

HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

HCM 6th TWSC

3: Mision Boulevard & Torrano Avenue (N)

Cumulative
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕	↕	
Traffic Vol, veh/h	0	37	0	2166	1755	53
Future Vol, veh/h	0	37	0	2166	1755	53
Conflicting Peds, #/hr	0	8	0	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	2	2
Mvmt Flow	0	39	0	2280	1847	56
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	964	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	259	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	256	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	21.6	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	256	-	-		
HCM Lane V/C Ratio	-	0.152	-	-		
HCM Control Delay (s)	-	21.6	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.5	-	-		

HCM 6th TWSC

4: Mision Boulevard & Torrano Avenue (S)

Cumulative
Timing Plan: PM

Intersection												
Int Delay, s/veh	34											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	2	0	9	7	0	21	33	2163	52	106	1756	5
Future Vol, veh/h	2	0	9	7	0	21	33	2163	52	106	1756	5
Conflicting Peds, #/hr	4	0	8	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	0	9	7	0	22	35	2277	55	112	1848	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	3288	4477	935	3531	4452	1170	1853	0	0	2332	0	0
Stage 1	2075	2075	-	2375	2375	-	-	-	-	-	-	-
Stage 2	1213	2402	-	1156	2077	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	4	1	271	~ 2	1	189	331	-	-	216	-	-
Stage 1	56	97	-	36	68	-	-	-	-	-	-	-
Stage 2	196	66	-	212	97	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 2	0	269	~ 1	0	188	331	-	-	216	-	-
Mov Cap-2 Maneuver	~ 2	0	-	~ 1	0	-	-	-	-	-	-	-
Stage 1	50	47	-	32	61	-	-	-	-	-	-	-
Stage 2	154	59	-	98	47	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 738		\$ 4582.3		0.3		2.2	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	331	-	-	11 4	216	-	-
HCM Lane V/C Ratio	0.105	-	-	1.053 7.368	0.517	-	-
HCM Control Delay (s)	17.1	-	-	\$ 738 \$ 4582.3	38.2	-	-
HCM Lane LOS	C	-	-	F F	E	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.1 5.3	2.7	-	-

Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon							

HCM 6th Signalized Intersection Summary

5: Mision Boulevard & Tennyson Road

Cumulative
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	786	28	413	17	92	9	699	1712	2	136	1221	803
Future Volume (veh/h)	786	28	413	17	92	9	699	1712	2	136	1221	803
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	802	29	421	17	94	9	713	1747	2	139	1246	819
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	745	403	342	21	118	119	587	2668	3	151	2152	668
Arrive On Green	0.22	0.22	0.22	0.08	0.08	0.08	0.17	0.51	0.51	0.08	0.42	0.42
Sat Flow, veh/h	3456	1870	1585	284	1572	1585	3456	5267	6	1781	5106	1585
Grp Volume(v), veh/h	802	29	421	111	0	9	713	1129	620	139	1246	819
Grp Sat Flow(s), veh/h/ln	1728	1870	1585	1856	0	1585	1728	1702	1869	1781	1702	1585
Q Serve(g_s), s	33.0	1.9	33.0	9.0	0.0	0.8	26.0	37.5	37.5	11.8	28.6	64.5
Cycle Q Clear(g_c), s	33.0	1.9	33.0	9.0	0.0	0.8	26.0	37.5	37.5	11.8	28.6	64.5
Prop In Lane	1.00		1.00	0.15		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	745	403	342	140	0	119	587	1724	947	151	2152	668
V/C Ratio(X)	1.08	0.07	1.23	0.80	0.00	0.08	1.21	0.65	0.65	0.92	0.58	1.23
Avail Cap(c_a), veh/h	745	403	342	400	0	342	587	1724	947	151	2152	668
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.0	47.8	60.0	69.6	0.0	65.8	63.5	27.9	27.9	69.5	33.9	44.3
Incr Delay (d2), s/veh	55.3	0.1	127.1	9.8	0.0	0.3	111.4	2.0	3.5	49.6	1.1	114.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.3	0.9	25.4	4.7	0.0	0.3	20.4	15.4	17.3	7.5	12.0	46.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	115.3	47.9	187.1	79.4	0.0	66.1	174.9	29.8	31.4	119.1	35.0	158.8
LnGrp LOS	F	D	F	E	A	E	F	C	C	F	D	F
Approach Vol, veh/h		1252			120			2462			2204	
Approach Delay, s/veh		137.9			78.4			72.2			86.3	
Approach LOS		F			E			E			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.0	69.5		15.5	17.0	82.5		38.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	26.0	43.0		33.0	13.0	56.0		33.0				
Max Q Clear Time (g_c+I1), s	28.0	66.5		11.0	13.8	39.5		35.0				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.0	10.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				91.1								
HCM 6th LOS				F								

HCM 6th Signalized Intersection Summary

6: Mision Boulevard & Harder Road

Cumulative
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔↔	↑↑↑		↔↔↔	↑↑↑	
Traffic Volume (veh/h)	530	637	561	226	417	77	533	1616	351	122	1285	341
Future Volume (veh/h)	530	637	561	226	417	77	533	1616	351	122	1285	341
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1885	1900	1900	1841	1885	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	558	671	591	238	439	81	561	1701	369	128	1353	359
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	0	0	4	1	1	1	0	2	2
Cap, veh/h	587	907	400	283	602	253	454	1877	401	196	1201	318
Arrive On Green	0.17	0.25	0.25	0.08	0.17	0.17	0.25	0.44	0.44	0.14	0.40	0.40
Sat Flow, veh/h	3510	3582	1581	3510	3610	1514	1795	4225	904	1810	4004	1059
Grp Volume(v), veh/h	558	671	591	238	439	81	561	1377	693	128	1150	562
Grp Sat Flow(s),veh/h/ln	1755	1791	1581	1755	1805	1514	1795	1716	1697	1810	1702	1659
Q Serve(g_s), s	23.6	25.8	38.0	10.0	17.3	7.1	37.9	55.9	57.5	10.0	45.0	45.0
Cycle Q Clear(g_c), s	23.6	25.8	38.0	10.0	17.3	7.1	37.9	55.9	57.5	10.0	45.0	45.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.64
Lane Grp Cap(c), veh/h	587	907	400	283	602	253	454	1524	754	196	1021	498
V/C Ratio(X)	0.95	0.74	1.48	0.84	0.73	0.32	1.24	0.90	0.92	0.65	1.13	1.13
Avail Cap(c_a), veh/h	587	907	400	304	770	323	454	1555	769	196	1021	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	51.5	56.0	68.0	59.3	55.0	56.1	38.7	39.2	61.5	45.1	45.1
Incr Delay (d2), s/veh	25.4	3.2	227.3	17.6	2.6	0.7	124.4	9.1	18.1	7.5	69.5	81.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	12.0	40.3	5.2	8.1	2.8	32.7	25.0	27.3	4.9	27.6	28.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.2	54.7	283.3	85.6	61.8	55.7	180.4	47.8	57.3	69.0	114.5	126.1
LnGrp LOS	F	D	F	F	E	E	F	D	E	E	F	F
Approach Vol, veh/h	1820			758			2631			1840		
Approach Delay, s/veh	138.9			68.6			78.6			114.9		
Approach LOS	F			E			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	41.9	50.0	29.1	29.0	20.3	71.6	16.1	42.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	37.0	45.0	19.0	32.0	14.0	68.0	13.0	38.0				
Max Q Clear Time (g_c+Q), s	39.5	47.0	25.6	19.3	12.0	59.5	12.0	40.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.5	0.1	7.1	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	102.6											
HCM 6th LOS	F											

HCM 6th TWSC

7: Dollar Street & Harder Road

Cumulative
Timing Plan: PM

Intersection												
Int Delay, s/veh	243.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	103	1640	60	27	1126	34	75	11	28	38	3	146
Future Vol, veh/h	103	1640	60	27	1126	34	75	11	28	38	3	146
Conflicting Peds, #/hr	4	0	9	9	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	2	4	1	0	0	0	0	3	0	0
Mvmt Flow	110	1745	64	29	1198	36	80	12	30	40	3	155
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1238	0	0	1818	0	0	2666	3302	914	2377	3316	622
Stage 1	-	-	-	-	-	-	2006	2006	-	1278	1278	-
Stage 2	-	-	-	-	-	-	660	1296	-	1099	2038	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.5	6.5	6.9	7.56	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Follow-up Hdwy	2.2	-	-	2.24	-	-	3.5	4	3.3	3.53	4	3.3
Pot Cap-1 Maneuver	570	-	-	325	-	-	~ 11	~ 9	279	~ 18	9	434
Stage 1	-	-	-	-	-	-	~ 63	105	-	174	239	-
Stage 2	-	-	-	-	-	-	423	234	-	225	101	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	568	-	-	322	-	-	~ 4	~ 7	277	-	7	432
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 4	~ 7	-	-	7	-
Stage 1	-	-	-	-	-	-	~ 50	84	-	140	217	-
Stage 2	-	-	-	-	-	-	243	212	-	139	81	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.4			\$ 7024.7					
HCM LOS							F			-		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	4 23		568	-	-	322	-	-	-	-	194	
HCM Lane V/C Ratio	19.947 1.804		0.193	-	-	0.089	-	-	-	-	0.817	
HCM Control Delay (s)	\$ 10291.7\$ 742.1		12.8	-	-	17.3	-	-	-	-	74.7	
HCM Lane LOS	F F		B	-	-	C	-	-	-	-	F	
HCM 95th %tile Q(veh)	12 5.3		0.7	-	-	0.3	-	-	-	-	5.8	
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM 6th Signalized Intersection Summary

8: Jane Avenue & Harder Road

Cumulative
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	348	1469	24	63	998	219	21	19	53	185	36	239
Future Volume (veh/h)	348	1469	24	63	998	219	21	19	53	185	36	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	391	1651	27	71	1121	246	24	21	60	208	40	269
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	2046	907	92	1513	663	101	92	328	319	50	412
Arrive On Green	0.07	0.19	0.19	0.05	0.42	0.42	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1795	3582	1588	1795	3582	1570	177	354	1264	999	192	1588
Grp Volume(v), veh/h	391	1651	27	71	1121	246	35	0	70	248	0	269
Grp Sat Flow(s),veh/h/ln	1795	1791	1588	1795	1791	1570	316	0	1479	1191	0	1588
Q Serve(g_s), s	22.0	48.5	1.5	4.3	28.9	11.8	1.6	0.0	4.1	18.6	0.0	16.6
Cycle Q Clear(g_c), s	22.0	48.5	1.5	4.3	28.9	11.8	24.2	0.0	4.1	22.7	0.0	16.6
Prop In Lane	1.00		1.00	1.00		1.00	0.69		0.85	0.84		1.00
Lane Grp Cap(c), veh/h	359	2046	907	92	1513	663	137	0	384	369	0	412
V/C Ratio(X)	1.09	0.81	0.03	0.77	0.74	0.37	0.25	0.00	0.18	0.67	0.00	0.65
Avail Cap(c_a), veh/h	359	2046	907	196	1513	663	267	0	538	514	0	578
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.27	0.27	0.27	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.4	38.8	19.8	51.6	26.7	21.8	39.8	0.0	31.7	40.5	0.0	36.3
Incr Delay (d2), s/veh	52.6	1.0	0.0	12.8	3.3	1.6	1.0	0.0	0.2	2.1	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	23.4	0.5	2.2	12.6	4.5	1.0	0.0	1.5	6.6	0.0	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.0	39.8	19.8	64.4	30.0	23.4	40.8	0.0	31.9	42.6	0.0	38.1
LnGrp LOS	F	D	B	E	C	C	D	A	C	D	A	D
Approach Vol, veh/h		2069			1438			105			517	
Approach Delay, s/veh		51.7			30.6			34.8			40.2	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	67.8		32.5	26.0	51.5		32.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	22.0	35.0		40.0				
Max Q Clear Time (g_c+l1), s	6.3	50.5		24.7	24.0	30.9		26.2				
Green Ext Time (p_c), s	0.1	0.0		2.3	0.0	2.8		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				42.5								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary9: Soto Road & Harder Road

Cumulative
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	1486	152	28	997	240	129	76	17	176	62	343
Future Volume (veh/h)	440	1486	152	28	997	240	129	76	17	176	62	343
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	478	1615	165	30	1084	261	140	83	18	191	67	373
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	473	1677	169	59	1009	433	141	491	106	440	81	452
Arrive On Green	0.26	0.51	0.51	0.03	0.28	0.28	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1795	3271	329	1795	3582	1538	955	1500	325	1300	248	1382
Grp Volume(v), veh/h	478	873	907	30	1084	261	140	0	101	191	0	440
Grp Sat Flow(s), veh/h/ln	1795	1791	1809	1795	1791	1538	955	0	1825	1300	0	1630
Q Serve(g_s), s	29.0	51.0	53.9	1.8	31.0	16.1	8.6	0.0	4.3	13.5	0.0	27.4
Cycle Q Clear(g_c), s	29.0	51.0	53.9	1.8	31.0	16.1	36.0	0.0	4.3	17.8	0.0	27.4
Prop In Lane	1.00		0.18	1.00		1.00	1.00		0.18	1.00		0.85
Lane Grp Cap(c), veh/h	473	918	928	59	1009	433	141	0	597	440	0	534
V/C Ratio(X)	1.01	0.95	0.98	0.51	1.07	0.60	1.00	0.00	0.17	0.43	0.00	0.82
Avail Cap(c_a), veh/h	473	918	928	229	1009	433	141	0	597	440	0	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.46	0.46	0.46	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.5	25.5	26.2	52.3	39.5	34.2	52.7	0.0	26.3	32.7	0.0	34.1
Incr Delay (d2), s/veh	43.8	19.9	24.7	3.1	42.6	2.8	74.6	0.0	0.1	0.7	0.0	10.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	25.2	27.8	0.9	19.2	6.3	6.8	0.0	1.9	4.4	0.0	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	84.3	45.4	50.8	55.5	82.1	37.0	127.3	0.0	26.5	33.4	0.0	44.3
LnGrp LOS	F	D	D	E	F	D	F	A	C	C	A	D
Approach Vol, veh/h	2258			1375			241			631		
Approach Delay, s/veh	55.8			72.9			85.0			41.0		
Approach LOS	E			E			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	61.4		41.0	33.0	36.0		41.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0	46.0		36.0	29.0	31.0		36.0				
Max Q Clear Time (g_c+13.8)	55.9	55.9		29.4	31.0	33.0		38.0				
Green Ext Time (p_c), s	0.0	0.0		2.1	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 60.5
HCM 6th LOS E

HCM 6th TWSC

10: Mision Boulevard & North Driveway

Cumulative
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	0	0	2450	2027	0
Future Vol, veh/h	0	0	0	2450	2027	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	0	0	2579	2134	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1067	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	190	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	190	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	-	-	-		
HCM Lane V/C Ratio	-	-	-	-		
HCM Control Delay (s)	-	0	-	-		
HCM Lane LOS	-	A	-	-		
HCM 95th %tile Q(veh)	-	-	-	-		

HCM 6th TWSC

11: Mision Boulevard & South Driveway

Cumulative
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	2450	2027	0
Future Vol, veh/h	0	0	0	2450	2027	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	0	0	2579	2134	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1067	2134	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	221	258	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	221	258	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	258	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	0	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Cumulative 2040 Queue Worksheets

Queues

Cumulative

1: Mission Boulevard & Carlos Bee Boulevard

Timing Plan: AM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	341	462	412	774	303	150	1861	197	459	2743	459
v/c Ratio	0.93	0.53	1.21	0.88	0.57	1.22	0.95	0.28	1.00	1.20	0.60
Control Delay	95.1	45.1	170.2	63.2	21.9	205.6	54.3	6.4	102.1	129.5	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	45.1	170.2	63.2	21.9	205.6	54.3	6.4	102.1	129.5	20.2
Queue Length 50th (ft)	163	181	~238	361	91	~180	608	12	~236	~1123	186
Queue Length 95th (ft)	#258	238	#346	442	191	#326	#717	64	#347	#1204	303
Internal Link Dist (ft)		743		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	366	891	341	906	537	123	1949	716	460	2287	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.52	1.21	0.85	0.56	1.22	0.95	0.28	1.00	1.20	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative

2: Mission Boulevard & Berry Avenue

Timing Plan: AM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	140	36	1929	45	3168
v/c Ratio	0.89	0.45	0.46	0.83	0.53	1.35
Control Delay	87.3	43.4	84.5	23.0	87.5	185.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.3	43.4	84.5	23.0	87.5	185.5
Queue Length 50th (ft)	183	90	33	730	41	~2083
Queue Length 95th (ft)	#308	155	#78	856	#100	#2189
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	276	356	79	2327	85	2342
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.39	0.46	0.83	0.53	1.35

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative

5: Mission Boulevard & Tennyson Road

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	802	24	575	208	13	380	1465	48	2727	733
v/c Ratio	0.77	0.04	0.80	0.75	0.04	1.47	0.77	0.58	1.61	1.03
Control Delay	48.3	33.5	26.1	70.4	0.2	274.0	41.7	89.5	308.3	69.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.3	33.5	26.1	70.4	0.2	274.0	41.7	89.5	308.3	69.6
Queue Length 50th (ft)	313	14	189	177	0	~285	439	42	~1253	~515
Queue Length 95th (ft)	412	38	366	248	0	#384	495	#101	#1316	#744
Internal Link Dist (ft)		1876		1688			894		973	
Turn Bay Length (ft)	470		225		315	500		240		210
Base Capacity (vph)	1046	567	720	445	454	258	1912	83	1695	711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.04	0.80	0.47	0.03	1.47	0.77	0.58	1.61	1.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative

6: Mission Boulevard & Harder Road

Timing Plan: AM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	448	407	573	277	200	80	317	1610	55	3227
v/c Ratio	0.60	0.45	1.18	1.23	0.60	0.41	1.66	0.69	0.31	1.43
Control Delay	53.1	45.8	134.9	186.2	67.5	17.8	355.8	30.5	63.0	226.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	45.8	134.9	186.2	67.5	17.8	355.8	30.5	63.0	226.6
Queue Length 50th (ft)	189	164	~525	~158	92	0	~416	436	45	~1448
Queue Length 95th (ft)	242	205	#700	#236	125	45	#573	412	92	#1419
Internal Link Dist (ft)		322			2082			357		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	746	899	486	226	814	362	191	2513	185	2259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.45	1.18	1.23	0.25	0.22	1.66	0.64	0.30	1.43

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

8: Jane Avenue & Harder Road

Cumulative

Timing Plan: AM

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	242	1011	4	21	691	159	141	228	367
v/c Ratio	0.78	0.45	0.00	0.19	0.42	0.20	0.18	0.75	0.55
Control Delay	61.7	15.0	0.0	52.3	23.4	4.6	17.2	52.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	15.0	0.0	52.3	23.4	4.6	17.2	52.8	6.1
Queue Length 50th (ft)	182	120	0	14	173	0	23	148	0
Queue Length 95th (ft)	#266	276	m0	40	270	45	43	209	62
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	340	2230	994	194	1633	804	1087	440	805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.45	0.00	0.11	0.42	0.20	0.13	0.52	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative

9: Soto Road & Harder Road

Timing Plan: AM

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	301	1186	16	1030	164	135	74	179	725
v/c Ratio	0.82	0.65	0.15	0.91	0.29	2.01	0.12	0.39	0.85
Control Delay	59.3	22.0	43.4	55.3	19.6	528.9	16.3	30.5	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	22.0	43.4	55.3	19.6	528.9	16.3	30.5	22.1
Queue Length 50th (ft)	202	273	12	282	17	~149	21	95	182
Queue Length 95th (ft)	276	406	m27	#516	98	#217	50	150	322
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	434	1828	193	1130	566	67	620	454	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.65	0.08	0.91	0.29	2.01	0.12	0.39	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative

1: Mision Boulevard & Carlos Bee Boulevard

Timing Plan: PM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	854	969	189	284	448	96	2233	361	567	2052	525
v/c Ratio	1.47	0.89	0.76	0.36	0.95	0.88	1.22	0.52	1.30	0.95	0.68
Control Delay	262.5	58.2	86.6	49.8	65.4	126.2	146.5	17.8	199.7	51.5	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	262.5	58.2	86.6	49.8	65.4	126.2	146.5	17.8	199.7	51.5	21.6
Queue Length 50th (ft)	~585	454	94	121	292	~96	~974	113	~383	700	214
Queue Length 95th (ft)	#716	547	#147	166	#502	#223	#1064	214	#505	#813	357
Internal Link Dist (ft)		496		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	581	1119	255	839	491	109	1824	700	436	2165	769
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.47	0.87	0.74	0.34	0.91	0.88	1.22	0.52	1.30	0.95	0.68

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative

2: Mision Boulevard & Berry Avenue

Timing Plan: PM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	71	89	2232	65	2019
v/c Ratio	0.57	0.61	0.57	0.80	0.50	0.77
Control Delay	68.2	69.5	78.3	27.9	79.2	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	69.5	78.3	27.9	79.2	14.6
Queue Length 50th (ft)	44	50	78	1070	62	542
Queue Length 95th (ft)	93	103	m87	1218	112	821
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	307	322	161	2800	136	2637
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.22	0.55	0.80	0.48	0.77

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative

5: Mision Boulevard & Tennyson Road

Timing Plan: PM

										
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	802	29	421	111	9	713	1749	139	1246	819
v/c Ratio	0.74	0.05	0.54	0.54	0.03	1.18	0.94	0.89	0.87	0.97
Control Delay	52.2	40.9	6.7	71.8	0.2	151.7	57.0	114.8	60.2	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	40.9	6.7	71.8	0.2	151.7	57.0	114.8	60.2	42.5
Queue Length 50th (ft)	357	20	0	109	0	~449	617	140	436	351
Queue Length 95th (ft)	#591	53	100	154	0	#577	#695	#279	498	#658
Internal Link Dist (ft)	1876			1698			1191		950	
Turn Bay Length (ft)	470			225		315		500		240
Base Capacity (vph)	1077	584	785	398	425	602	1870	157	1429	842
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.05	0.54	0.28	0.02	1.18	0.94	0.89	0.87	0.97

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative

6: Mision Boulevard & Harder Road

Timing Plan: PM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	558	671	591	238	439	81	561	2070	128	1712
v/c Ratio	0.89	0.79	0.88	0.66	0.76	0.22	1.27	0.91	0.76	1.13
Control Delay	76.8	61.2	33.6	74.7	68.5	1.4	185.2	44.4	77.6	106.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.8	61.2	33.6	74.7	68.5	1.4	185.2	44.4	77.6	106.5
Queue Length 50th (ft)	278	320	209	119	218	0	~691	670	125	~700
Queue Length 95th (ft)	#452	394	#433	#182	267	1	#926	742	m#171	#789
Internal Link Dist (ft)		322			2082			387		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	627	905	688	360	770	435	440	2279	169	1513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.74	0.86	0.66	0.57	0.19	1.27	0.91	0.76	1.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

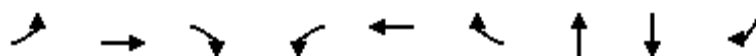
m Volume for 95th percentile queue is metered by upstream signal.

Queues

8: Jane Avenue & Harder Road

Cumulative

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	391	1651	27	71	1121	246	105	248	269
v/c Ratio	0.76	0.82	0.03	0.45	0.91	0.36	0.14	0.77	0.45
Control Delay	51.1	27.8	6.8	56.0	47.4	6.9	13.7	53.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.1	27.8	6.8	56.0	47.4	6.9	13.7	53.3	5.8
Queue Length 50th (ft)	289	409	0	48	406	12	12	163	0
Queue Length 95th (ft)	m#353	m#750	m3	91	#550	69	30	222	53
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	514	2008	885	199	1229	687	1056	469	743
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.82	0.03	0.36	0.91	0.36	0.10	0.53	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative

9: Soto Road & Harder Road

Timing Plan: PM

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	478	1780	30	1084	261	140	101	191	440
v/c Ratio	0.99	0.97	0.25	1.08	0.45	1.01	0.17	0.46	0.62
Control Delay	80.1	42.0	34.4	105.4	32.1	117.3	24.4	33.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	42.0	34.4	105.4	32.1	117.3	24.4	33.8	15.6
Queue Length 50th (ft)	~347	~722	22	~464	116	98	45	106	94
Queue Length 95th (ft)	#560	#893	m29	m#560	m148	#228	86	176	202
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	482	1837	227	1007	583	142	604	424	719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.97	0.13	1.08	0.45	0.99	0.17	0.45	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Cumulative 2040 Peak Hour Signal Warrants



KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
EIR\analysis\signal warrants\Mission&Torrano
S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Cumulative AM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
8:00 AM	9:00 AM	1783	839	1	39
2nd Highest Hour		1688	794	1	35
3rd Highest Hour		1664	783	1	30
4th Highest Hour		1593	750	1	30
5th Highest Hour		1569	738	1	26
6th Highest Hour		1569	738	1	26
7th Highest Hour		1498	705	1	25
8th Highest Hour		1474	694	1	23
9th Highest Hour		1426	671	1	22
10th Highest Hour		1331	626	1	21
11th Highest Hour		1284	604	1	21
12th Highest Hour		1260	593	1	21
13th Highest Hour		1212	571	1	20
14th Highest Hour		1046	492	0	17
15th Highest Hour		832	392	0	16
16th Highest Hour		785	369	0	12
17th Highest Hour		547	257	0	12
18th Highest Hour		452	213	0	8
19th Highest Hour		238	112	0	5
20th Highest Hour		166	78	0	4
21st Highest Hour		143	67	0	2
22nd Highest Hour		95	45	0	2
23rd Highest Hour		48	22	0	2
24th Highest Hour		48	22	0	1

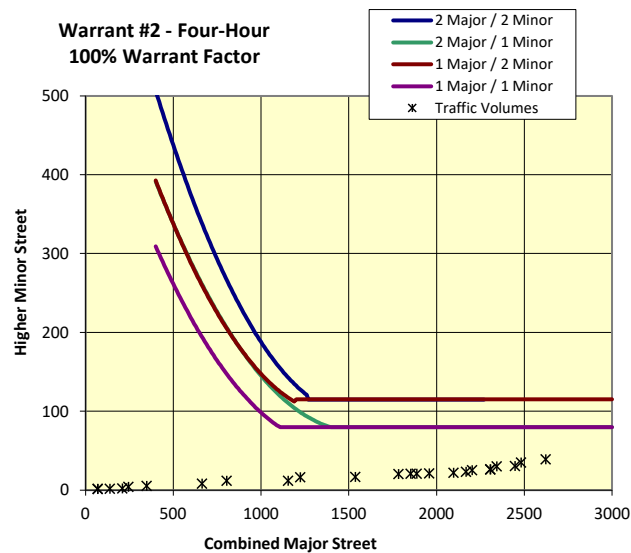
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

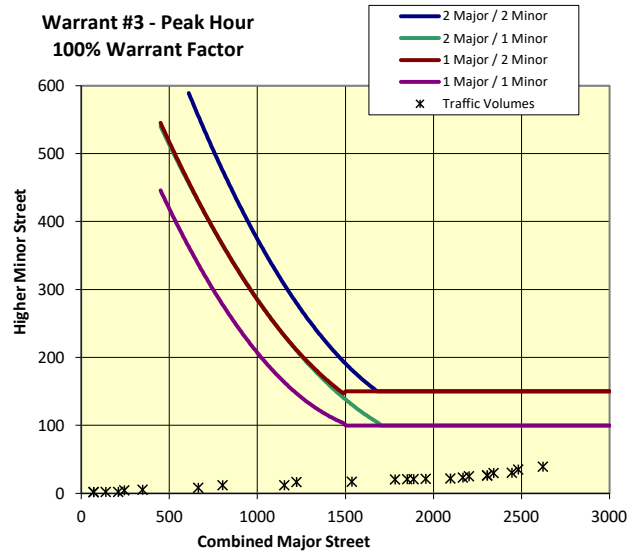
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor





KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
EIR\analysis\signal warrants\Mission&Torrano
S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrono Avenue (South)
Scenario: Cumulative PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

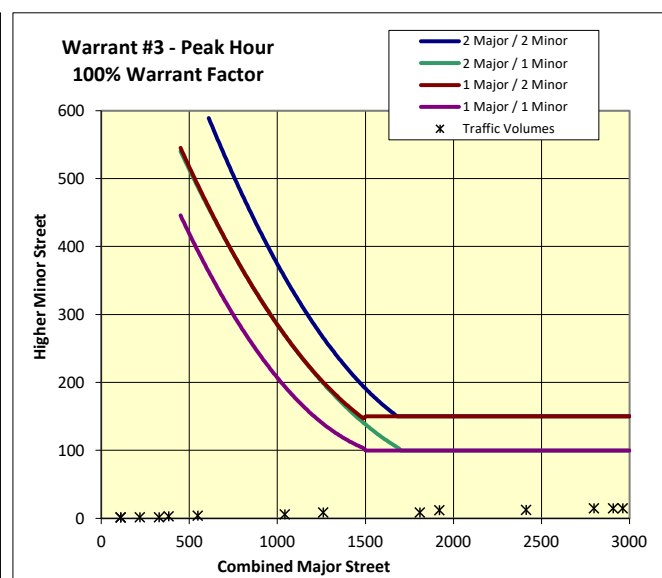
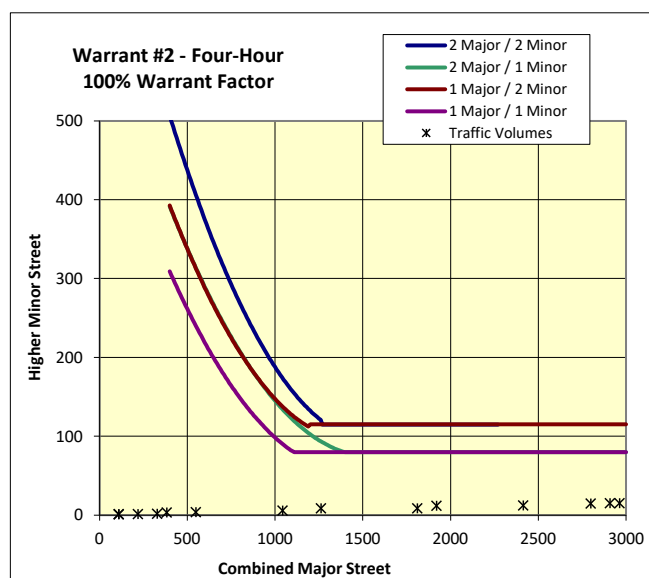
Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
5:00 PM	6:00 PM	2248	1867	11	28
2nd Highest Hour		2128	1767	10	25
3rd Highest Hour		2098	1743	9	22
4th Highest Hour		2008	1668	8	21
5th Highest Hour		1978	1643	7	19
6th Highest Hour		1978	1643	7	19
7th Highest Hour		1888	1568	7	18
8th Highest Hour		1858	1543	7	17
9th Highest Hour		1798	1494	6	16
10th Highest Hour		1679	1394	6	15
11th Highest Hour		1619	1344	6	15
12th Highest Hour		1589	1319	6	15
13th Highest Hour		1529	1270	6	14
14th Highest Hour		1319	1095	5	12
15th Highest Hour		1049	871	5	12
16th Highest Hour		989	821	3	8
17th Highest Hour		689	573	3	8
18th Highest Hour		569	473	2	6
19th Highest Hour		300	249	1	4
20th Highest Hour		210	174	1	3
21st Highest Hour		180	149	1	2
22nd Highest Hour		120	100	0	1
23rd Highest Hour		60	50	0	1
24th Highest Hour		60	50	0	1

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Warrant Harder&Dollar CUM
Intersection: Harder Road & Dollar Street
Scenario: Cumulative AM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:00 AM	8:00 AM	991	609	175	219
2nd Highest Hour		938	577	156	195
3rd Highest Hour		925	568	135	170
4th Highest Hour		885	544	134	167
5th Highest Hour		872	536	119	148
6th Highest Hour		872	536	117	146
7th Highest Hour		832	512	113	141
8th Highest Hour		819	503	103	130
9th Highest Hour		793	487	98	122
10th Highest Hour		740	455	94	118
11th Highest Hour		714	438	92	115
12th Highest Hour		700	430	92	115
13th Highest Hour		674	414	90	113
14th Highest Hour		581	357	75	94
15th Highest Hour		462	284	73	92
16th Highest Hour		436	268	53	66
17th Highest Hour		304	187	53	66
18th Highest Hour		251	154	36	45
19th Highest Hour		132	81	23	28
20th Highest Hour		92	57	19	24
21st Highest Hour		79	49	9	12
22nd Highest Hour		53	32	8	9
23rd Highest Hour		26	16	8	9
24th Highest Hour		26	16	6	7

Warrant Summary

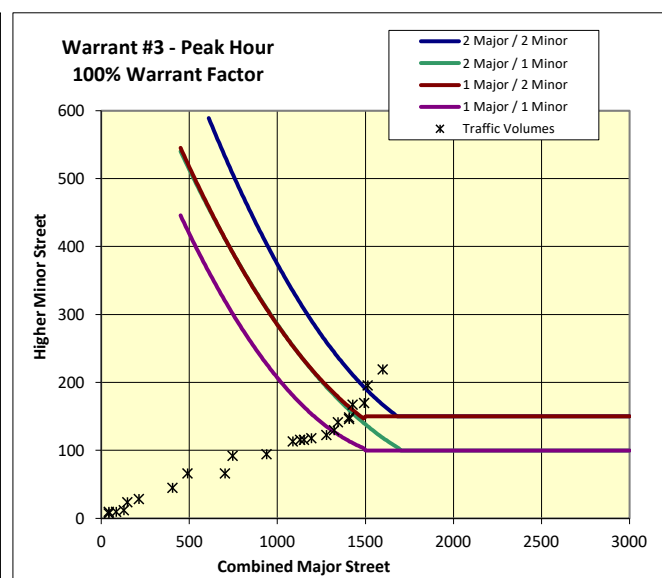
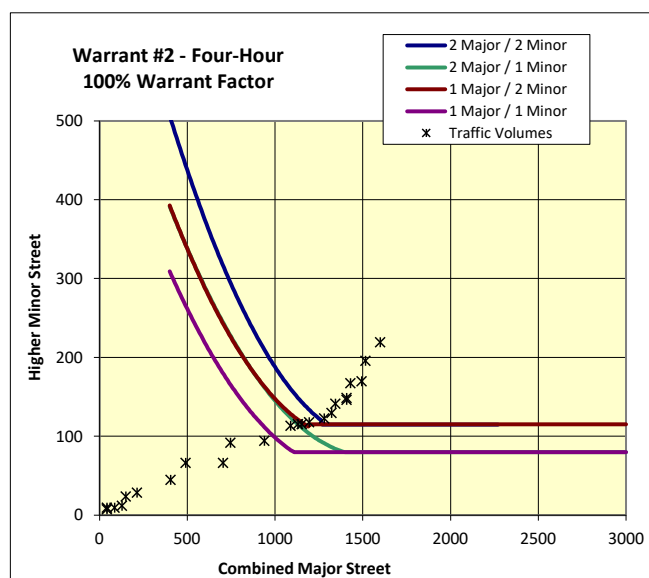
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	4	No	Yes
	B	900	75	14	Yes	
80%	A	480	120	9	Yes	Yes
	B	720	60	15	Yes	
70%	A	420	105	13	Yes	Yes
	B	630	53	16	Yes	
56%	A	336	84	15	Yes	Yes
	B	504	42	16	Yes	





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Warrant Harder&Dollar CUM
Intersection: Harder Road & Dollar Street
Scenario: Cumulative PM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	1803	1187	114	187
2nd Highest Hour		1707	1124	102	167
3rd Highest Hour		1683	1108	88	145
4th Highest Hour		1611	1060	87	143
5th Highest Hour		1587	1045	77	127
6th Highest Hour		1587	1045	76	125
7th Highest Hour		1515	997	74	121
8th Highest Hour		1490	981	67	111
9th Highest Hour		1442	950	64	105
10th Highest Hour		1346	886	61	101
11th Highest Hour		1298	855	60	99
12th Highest Hour		1274	839	60	99
13th Highest Hour		1226	807	59	97
14th Highest Hour		1058	696	49	80
15th Highest Hour		841	554	48	78
16th Highest Hour		793	522	34	56
17th Highest Hour		553	364	34	56
18th Highest Hour		457	301	23	38
19th Highest Hour		240	158	15	24
20th Highest Hour		168	111	12	20
21st Highest Hour		144	95	6	10
22nd Highest Hour		96	63	5	8
23rd Highest Hour		48	32	5	8
24th Highest Hour		48	32	4	6

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

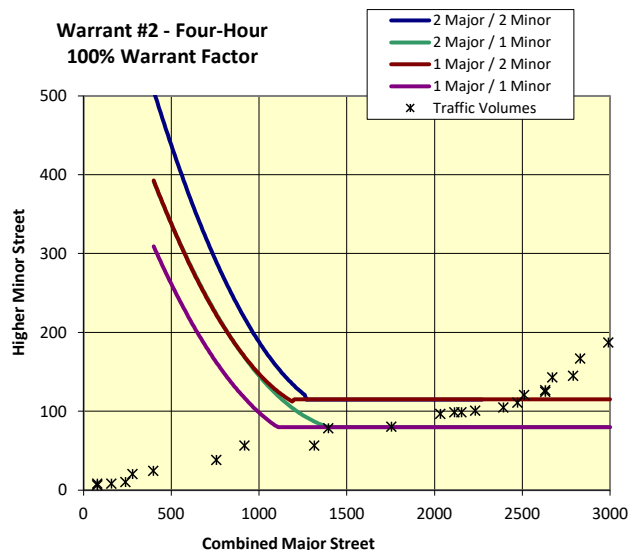
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

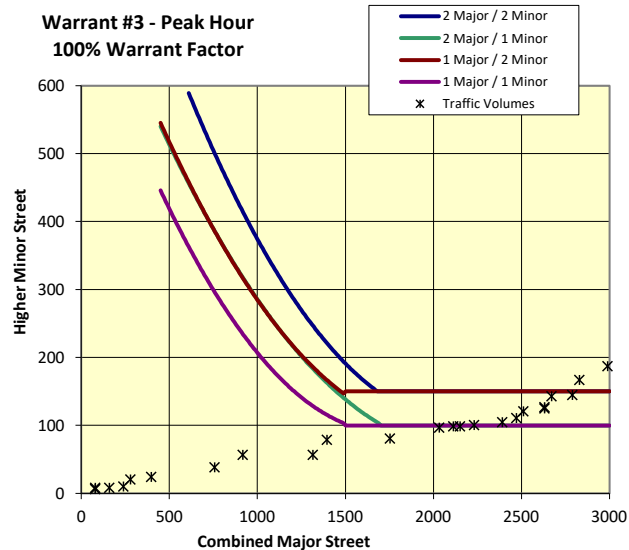
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	2	No	Yes
	B	900	75	15	Yes	
80%	A	480	120	7	No	Yes
	B	720	60	15	Yes	
70%	A	420	105	9	Yes	Yes
	B	630	53	17	Yes	
56%	A	336	84	13	Yes	Yes
	B	504	42	17	Yes	

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor



Appendix 6 Cumulative 2040 Plus Project
Level of Service, Queue, and
Peak Hour Traffic Signal
Warrant Worksheets

Cumulative 2040 Plus Project Level of Service Worksheets

HCM 6th Signalized Intersection Summary

1: Mision Boulevard & Carlos Bee Boulevard

Cumulative + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	314	325	104	381	712	280	141	1731	183	422	2544	423
Future Volume (veh/h)	314	325	104	381	712	280	141	1731	183	422	2544	423
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	341	353	113	414	774	304	153	1882	199	459	2765	460
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	368	664	209	343	865	383	113	2025	631	442	2363	691
Arrive On Green	0.11	0.25	0.25	0.10	0.24	0.24	0.06	0.40	0.40	0.13	0.47	0.47
Sat Flow, veh/h	3483	2675	843	3483	3582	1588	1781	5025	1566	3483	5066	1481
Grp Volume(v), veh/h	341	235	231	414	774	304	153	1882	199	459	2765	460
Grp Sat Flow(s),veh/h/ln	1742	1791	1727	1742	1791	1588	1781	1675	1566	1742	1689	1481
Q Serve(g_s), s	13.8	16.1	16.5	14.0	29.7	25.5	9.0	50.8	12.3	18.0	66.2	34.1
Cycle Q Clear(g_c), s	13.8	16.1	16.5	14.0	29.7	25.5	9.0	50.8	12.3	18.0	66.2	34.1
Prop In Lane	1.00		0.49	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	368	445	429	343	865	383	113	2025	631	442	2363	691
V/C Ratio(X)	0.93	0.53	0.54	1.21	0.90	0.79	1.36	0.93	0.32	1.04	1.17	0.67
Avail Cap(c_a), veh/h	368	467	450	343	908	403	113	2025	631	442	2363	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	46.2	46.3	64.0	52.1	50.5	66.5	40.5	29.0	62.0	37.9	29.3
Incr Delay (d2), s/veh	29.1	1.0	1.2	116.8	11.1	10.0	206.8	9.1	1.3	53.5	81.6	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	7.4	7.4	11.8	14.7	11.3	10.6	22.2	5.0	11.2	44.3	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.1	47.1	47.5	180.8	63.2	60.6	273.3	49.5	30.3	115.5	119.5	34.3
LnGrp LOS	F	D	D	F	E	E	F	D	C	F	F	C
Approach Vol, veh/h	807			1492			2234			3684		
Approach Delay, s/veh	66.2			95.3			63.2			108.3		
Approach LOS	E			F			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	71.2	19.0	38.8	22.0	62.2	18.0	39.8				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	9.0	64.5	15.0	36.0	18.0	55.5	14.0	37.0				
Max Q Clear Time (g_c+I1), s	11.0	68.2	15.8	31.7	20.0	52.8	16.0	18.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.4	0.0	2.5	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay	89.6											
HCM 6th LOS	F											

HCM 6th Signalized Intersection Summary

2: Mision Boulevard & Berry Avenue

Cumulative + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	158	4	35	71	2	57	33	1796	4	42	2864	75
Future Volume (veh/h)	158	4	35	71	2	57	33	1796	4	42	2864	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1811	1841	1841	1900	1856	1856
Adj Flow Rate, veh/h	172	4	38	77	2	62	36	1952	4	46	3113	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	6	4	4	0	3	3
Cap, veh/h	253	5	46	201	16	139	51	2439	5	60	2402	63
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.03	0.68	0.68	0.03	0.68	0.68
Sat Flow, veh/h	1071	25	237	834	81	719	1725	3581	7	1810	3507	92
Grp Volume(v), veh/h	214	0	0	141	0	0	36	953	1003	46	1557	1638
Grp Sat Flow(s), veh/h/ln	1333	0	0	1635	0	0	1725	1749	1839	1810	1763	1836
Q Serve(g_s), s	11.6	0.0	0.0	0.0	0.0	0.0	2.9	53.8	53.9	3.6	96.6	96.6
Cycle Q Clear(g_c), s	22.0	0.0	0.0	10.4	0.0	0.0	2.9	53.8	53.9	3.6	96.6	96.6
Prop In Lane	0.80		0.18	0.55		0.44	1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	304	0	0	356	0	0	51	1191	1253	60	1207	1257
V/C Ratio(X)	0.70	0.00	0.00	0.40	0.00	0.00	0.71	0.80	0.80	0.77	1.29	1.30
Avail Cap(c_a), veh/h	360	0	0	415	0	0	73	1191	1253	77	1207	1257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	0.0	0.0	50.0	0.0	0.0	67.8	15.7	15.7	67.7	22.2	22.2
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.7	0.0	0.0	16.5	5.7	5.4	29.4	136.6	142.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.0	4.5	0.0	0.0	1.5	21.5	22.6	2.1	81.2	86.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	0.0	0.0	50.7	0.0	0.0	84.3	21.4	21.2	97.0	158.8	164.5
LnGrp LOS	E	A	A	D	A	A	F	C	C	F	F	F
Approach Vol, veh/h		214			141			1992			3241	
Approach Delay, s/veh		60.0			50.7			22.4			160.8	
Approach LOS		E			D			C			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	101.6		31.3	8.6	101.1		31.3				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	6.0	89.0		33.0	6.0	89.0		33.0				
Max Q Clear Time (g_c+14), s	14.9	98.6		12.4	5.6	55.9		24.0				
Green Ext Time (p_c), s	0.0	0.0		0.8	0.0	20.9		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				104.9								
HCM 6th LOS				F								

HCM 6th TWSC

3: Mision Boulevard & Torrano Ave (N)

Cumulative + Project
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↗↗	↗↗	
Traffic Vol, veh/h	0	26	0	1787	2783	122
Future Vol, veh/h	0	26	0	1787	2783	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	4	3	3
Mvmt Flow	0	28	0	1922	2992	131
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1562	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	103	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	103	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	52.5	0		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 103		-	-		
HCM Lane V/C Ratio	- 0.271		-	-		
HCM Control Delay (s)	- 52.5		-	-		
HCM Lane LOS	- F		-	-		
HCM 95th %tile Q(veh)	- 1		-	-		

HCM 6th TWSC

4: Mision Boulevard & Torrano Ave (S)

Cumulative + Project
Timing Plan: AM

Intersection												
Int Delay, s/veh	50.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	9	0	30	15	1771	23	86	2778	2
Future Vol, veh/h	0	0	1	9	0	30	15	1771	23	86	2778	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	1	10	0	32	16	1904	25	92	2987	2
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	4200	5165	1531	3651	5154	997	3011	0	0	1939	0	0
Stage 1	3194	3194	-	1959	1959	-	-	-	-	-	-	-
Stage 2	1006	1971	-	1692	3195	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	1	0	108	~ 2	0	246	116	-	-	307	-	-
Stage 1	10	25	-	67	111	-	-	-	-	-	-	-
Stage 2	262	109	-	99	25	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1	0	104	~ 1	0	239	114	-	-	304	-	-
Mov Cap-2 Maneuver	1	0	-	~ 1	0	-	-	-	-	-	-	-
Stage 1	8	17	-	57	94	-	-	-	-	-	-	-
Stage 2	191	93	-	67	17	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	40		\$ 6005.2			0.3			0.7			
HCM LOS	E		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	114	-	-	104	4	304	-	-				
HCM Lane V/C Ratio	0.141	-	-	0.01	10.484	0.304	-	-				
HCM Control Delay (s)	41.7	-	-	\$ 6005.2	21.9	-	-	-				
HCM Lane LOS	E	-	-	E	F	C	-	-				
HCM 95th %tile Q(veh)	0.5	-	-	0	7	1.3	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM 6th Signalized Intersection Summary 5: Mision Boulevard & Tennyson Road

Cumulative + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	725	21	512	83	103	13	338	1311	3	44	2441	655
Future Volume (veh/h)	725	21	512	83	103	13	338	1311	3	44	2441	655
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	815	24	575	93	116	15	380	1473	3	49	2743	736
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	845	457	387	110	137	213	154	2370	5	67	2263	703
Arrive On Green	0.24	0.24	0.24	0.13	0.13	0.13	0.04	0.45	0.45	0.04	0.44	0.44
Sat Flow, veh/h	3456	1870	1585	814	1016	1585	3456	5262	11	1781	5106	1585
Grp Volume(v), veh/h	815	24	575	209	0	15	380	953	523	49	2743	736
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1830	0	1585	1728	1702	1868	1781	1702	1585
Q Serve(g_s), s	31.5	1.3	33.0	15.1	0.0	1.1	6.0	28.8	28.8	3.7	59.8	59.8
Cycle Q Clear(g_c), s	31.5	1.3	33.0	15.1	0.0	1.1	6.0	28.8	28.8	3.7	59.8	59.8
Prop In Lane	1.00		1.00	0.44		1.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	845	457	387	246	0	213	154	1533	841	67	2263	703
V/C Ratio(X)	0.96	0.05	1.48	0.85	0.00	0.07	2.47	0.62	0.62	0.74	1.21	1.05
Avail Cap(c_a), veh/h	845	457	387	447	0	387	154	1533	841	79	2263	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	39.0	51.0	57.1	0.0	51.0	64.5	28.3	28.3	64.3	37.6	37.6
Incr Delay (d2), s/veh	22.7	0.0	231.2	8.0	0.0	0.1	682.5	1.9	3.4	25.1	99.7	47.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.3	0.6	38.0	7.6	0.0	0.5	17.2	11.8	13.4	2.1	45.0	31.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	39.1	282.2	65.0	0.0	51.2	747.0	30.2	31.8	89.4	137.3	84.6
LnGrp LOS	E	D	F	E	A	D	F	C	C	F	F	F
Approach Vol, veh/h	1414			224			1856			3528		
Approach Delay, s/veh	157.6			64.1			177.4			125.7		
Approach LOS	F			E			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	64.8		22.2	9.0	65.8		38.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	6.0	45.0		33.0	6.0	45.0		33.0				
Max Q Clear Time (g_c+I1), s	8.0	61.8		17.1	5.7	30.8		35.0				
Green Ext Time (p_c), s	0.0	0.0		1.1	0.0	7.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	143.8											
HCM 6th LOS	F											

HCM 6th Signalized Intersection Summary

6: Mision Boulevard & Harder Road

Cumulative + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔↔	↑↑↑		↔↔↔	↑↑↑	
Traffic Volume (veh/h)	419	356	494	238	177	69	293	1207	170	47	2617	185
Future Volume (veh/h)	419	356	494	238	177	69	293	1207	170	47	2617	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1885	1856	1900	1870	1589	1870	1841	1841	1841	1856	1856
Adj Flow Rate, veh/h	487	414	574	277	206	80	341	1403	198	55	3043	215
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	4	1	3	0	2	21	2	4	4	4	3	3
Cap, veh/h	675	902	388	227	420	154	192	1737	245	298	2191	151
Arrive On Green	0.20	0.25	0.25	0.06	0.12	0.12	0.11	0.39	0.39	0.17	0.45	0.45
Sat Flow, veh/h	3401	3582	1539	3510	3554	1304	1781	4440	626	1753	4833	333
Grp Volume(v), veh/h	487	414	574	277	206	80	341	1059	542	55	2103	1155
Grp Sat Flow(s),veh/h/ln	1700	1791	1539	1755	1777	1304	1781	1675	1716	1753	1689	1789
Q Serve(g_s), s	18.6	13.6	35.0	9.0	7.5	8.0	15.0	39.1	39.1	3.7	63.0	63.0
Cycle Q Clear(g_c), s	18.6	13.6	35.0	9.0	7.5	8.0	15.0	39.1	39.1	3.7	63.0	63.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		0.19
Lane Grp Cap(c), veh/h	675	902	388	227	420	154	192	1311	671	298	1531	811
V/C Ratio(X)	0.72	0.46	1.48	1.22	0.49	0.52	1.77	0.81	0.81	0.18	1.37	1.42
Avail Cap(c_a), veh/h	675	902	388	227	818	300	192	1639	839	298	1531	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	44.0	52.0	65.0	57.4	57.6	62.0	37.6	37.6	49.5	38.0	38.0
Incr Delay (d2), s/veh	3.8	0.4	229.8	131.4	0.9	2.7	368.6	5.4	10.1	0.3	172.4	198.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	6.1	38.1	8.2	3.4	2.8	26.4	16.8	18.1	1.7	61.8	71.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.9	44.4	281.8	196.4	58.3	60.3	430.6	43.1	47.7	49.8	210.4	236.2
LnGrp LOS	E	D	F	F	E	E	F	D	D	D	F	F
Approach Vol, veh/h	1475			563			1942			3313		
Approach Delay, s/veh	140.6			126.5			112.4			216.7		
Approach LOS	F			F			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), \$9.0	68.0	31.6	20.4	27.6	59.4	13.0	39.0					
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	5.0	63.0	12.0	32.0	10.0	68.0	9.0	35.0				
Max Q Clear Time (g_c+I1), s	11.0	65.0	20.6	10.0	5.7	41.1	11.0	37.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.5	0.0	13.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 166.6
HCM 6th LOS F

HCM 6th TWSC
7: Dollar Street & Harder Road

Cumulative + Project
Timing Plan: AM

Intersection												
Int Delay, s/veh	188.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰		↰	↰	
Traffic Vol, veh/h	60	1038	134	66	548	20	98	8	83	35	13	197
Future Vol, veh/h	60	1038	134	66	548	20	98	8	83	35	13	197
Conflicting Peds, #/hr	6	0	10	10	0	6	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	6	3	0	0	4	0	0	20	0	9	0	3
Mvmt Flow	70	1207	156	77	637	23	114	9	97	41	15	229

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	666	0	0	1373	0	0	1917	2255	692	1557	2322	338
Stage 1	-	-	-	-	-	-	1435	1435	-	809	809	-
Stage 2	-	-	-	-	-	-	482	820	-	748	1513	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.5	6.9	6.9	7.68	6.5	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	6.68	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.5	4.2	3.3	3.59	4	3.33
Pot Cap-1 Maneuver	893	-	-	506	-	-	~ 42	32	391	71	38	655
Stage 1	-	-	-	-	-	-	143	168	-	326	396	-
Stage 2	-	-	-	-	-	-	540	347	-	355	184	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	888	-	-	501	-	-	~ 13	25	387	~ 32	29	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 13	25	-	~ 32	29	-
Stage 1	-	-	-	-	-	-	130	153	-	299	333	-
Stage 2	-	-	-	-	-	-	282	292	-	231	168	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.4	\$ 2134.8	119.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	13	170	888	-	-	501	-	-	32	279
HCM Lane V/C Ratio	8.766	0.622	0.079	-	-	0.153	-	-	1.272	0.875
HCM Control Delay (s)	\$ 4065.2	55.9	9.4	-	-	13.5	-	-	\$ 439.7	66.4
HCM Lane LOS	F	F	A	-	-	B	-	-	F	F
HCM 95th %tile Q(veh)	15.4	3.5	0.3	-	-	0.5	-	-	4.5	7.6

Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon						

HCM 6th Signalized Intersection Summary8: Jane Avenue & Harder Road

Cumulative + Project
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	960	4	22	665	149	27	49	62	191	19	338
Future Volume (veh/h)	223	960	4	22	665	149	27	49	62	191	19	338
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	242	1043	4	24	723	162	29	53	67	208	21	367
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	273	2127	946	34	1649	725	90	184	283	325	26	428
Arrive On Green	0.15	0.59	0.59	0.02	0.46	0.46	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	3582	1594	1795	3582	1575	144	685	1052	975	98	1590
Grp Volume(v), veh/h	242	1043	4	24	723	162	52	0	97	229	0	367
Grp Sat Flow(s), veh/h/ln	1795	1791	1594	1795	1791	1575	361	0	1521	1073	0	1590
Q Serve(g_s), s	14.5	18.4	0.1	1.5	15.0	6.8	2.0	0.0	5.5	18.1	0.0	24.1
Cycle Q Clear(g_c), s	14.5	18.4	0.1	1.5	15.0	6.8	25.5	0.0	5.5	23.6	0.0	24.1
Prop In Lane	1.00		1.00	1.00		1.00	0.56		0.69	0.91		1.00
Lane Grp Cap(c), veh/h	273	2127	946	34	1649	725	148	0	409	351	0	428
V/C Ratio(X)	0.89	0.49	0.00	0.71	0.44	0.22	0.35	0.00	0.24	0.65	0.00	0.86
Avail Cap(c_a), veh/h	326	2127	946	196	1649	725	268	0	553	476	0	578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.7	12.8	9.1	53.7	20.1	17.8	37.6	0.0	31.4	40.6	0.0	38.2
Incr Delay (d2), s/veh	16.7	0.6	0.0	23.5	0.8	0.7	1.4	0.0	0.3	2.0	0.0	9.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	7.0	0.0	0.9	6.2	2.6	1.4	0.0	2.1	6.1	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	13.4	9.1	77.2	20.9	18.6	39.0	0.0	31.7	42.6	0.0	47.6
LnGrp LOS	E	B	A	E	C	B	D	A	C	D	A	D
Approach Vol, veh/h		1289			909			149			596	
Approach Delay, s/veh		22.6			22.0			34.2			45.7	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	70.3		33.6	20.7	55.7		33.6				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	20.0	37.0		40.0				
Max Q Clear Time (g_c+I1), s	3.5	20.4		26.1	16.5	17.0		27.5				
Green Ext Time (p_c), s	0.0	8.0		2.5	0.2	5.4		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				27.7								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Cumulative + Project
Timing Plan: AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	259	975	71	15	912	145	116	38	27	158	30	593
Future Volume (veh/h)	259	975	71	15	912	145	116	38	27	158	30	593
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	1134	83	17	1060	169	135	44	31	184	35	690
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1688	123	39	1206	510	65	352	248	483	27	524
Arrive On Green	0.19	0.51	0.51	0.02	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	3342	244	1781	3554	1503	729	1020	719	1322	77	1516
Grp Volume(v), veh/h	301	602	615	17	1060	169	135	0	75	184	0	725
Grp Sat Flow(s), veh/h/ln	1781	1777	1810	1781	1777	1503	729	0	1739	1322	0	1593
Q Serve(g_s), s	18.2	27.9	28.0	1.0	30.9	9.2	0.0	0.0	3.2	12.2	0.0	38.0
Cycle Q Clear(g_c), s	18.2	27.9	28.0	1.0	30.9	9.2	38.0	0.0	3.2	15.4	0.0	38.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.41	1.00		0.95
Lane Grp Cap(c), veh/h	335	898	914	39	1206	510	65	0	601	483	0	550
V/C Ratio(X)	0.90	0.67	0.67	0.43	0.88	0.33	2.06	0.00	0.12	0.38	0.00	1.32
Avail Cap(c_a), veh/h	437	898	914	194	1206	510	65	0	601	483	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.6	20.4	20.4	53.1	34.2	27.0	55.0	0.0	24.6	29.9	0.0	36.0
Incr Delay (d2), s/veh	17.7	4.0	3.9	6.4	8.2	1.5	526.6	0.0	0.1	0.5	0.0	155.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	12.0	12.2	0.5	14.3	3.5	11.4	0.0	1.4	4.0	0.0	38.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.3	24.4	24.3	59.5	42.4	28.6	581.6	0.0	24.7	30.4	0.0	191.4
LnGrp LOS	E	C	C	E	D	C	F	A	C	C	A	F
Approach Vol, veh/h	1518			1246			210			909		
Approach Delay, s/veh	31.7			40.8			382.7			158.8		
Approach LOS	C			D			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	60.6			43.0	24.7	42.3		43.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0			38.0	27.0	31.0		38.0				
Max Q Clear Time (g_c+13.0), s	30.0			40.0	20.2	32.9		40.0				
Green Ext Time (p_c), s	0.0	7.3		0.0	0.5	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	83.3											
HCM 6th LOS	F											

HCM 6th TWSC
10: Harder Road & North Driveway

Cumulative + Project
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	14	0	1619	3331	18
Future Vol, veh/h	0	14	0	1619	3331	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	16	0	1883	3873	21
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1947	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	48	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	48	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	114.5	0		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	48	-	-		
HCM Lane V/C Ratio	-	0.339	-	-		
HCM Control Delay (s)	-	114.5	-	-		
HCM Lane LOS	-	F	-	-		
HCM 95th %tile Q(veh)	-	1.2	-	-		

HCM 6th TWSC

11: Harder Road & South Driveway

Cumulative + Project
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	15	6	1615	3329	17
Future Vol, veh/h	0	15	6	1615	3329	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	17	7	1878	3871	20
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1946	3891	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	56	51	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	56	51	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	96.1	0.3		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	51	-	56	-	-	
HCM Lane V/C Ratio	0.137	-	0.311	-	-	
HCM Control Delay (s)	86.5	-	96.1	-	-	
HCM Lane LOS	F	-	F	-	-	
HCM 95th %tile Q(veh)	0.4	-	1.1	-	-	

HCM 6th Signalized Intersection Summary

1: Mission Boulevard & Carlos Bee Boulevard

Cumulative + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	786	689	207	175	261	412	92	2071	334	522	1906	483
Future Volume (veh/h)	786	689	207	175	261	412	92	2071	334	522	1906	483
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1841	1885	1885	1856	1781
Adj Flow Rate, veh/h	854	749	225	190	284	448	100	2251	363	567	2072	525
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	2	4	1	1	3	8
Cap, veh/h	584	908	273	235	841	373	108	1838	572	397	2125	621
Arrive On Green	0.17	0.34	0.34	0.07	0.23	0.23	0.06	0.37	0.37	0.11	0.42	0.42
Sat Flow, veh/h	3483	2711	814	3483	3582	1587	1781	5025	1565	3483	5066	1480
Grp Volume(v), veh/h	854	495	479	190	284	448	100	2251	363	567	2072	525
Grp Sat Flow(s),veh/h/ln	1742	1791	1734	1742	1791	1587	1781	1675	1565	1742	1689	1480
Q Serve(g_s), s	25.0	37.8	37.8	8.0	9.8	35.0	8.3	54.5	28.5	17.0	59.9	47.5
Cycle Q Clear(g_c), s	25.0	37.8	37.8	8.0	9.8	35.0	8.3	54.5	28.5	17.0	59.9	47.5
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	584	600	581	235	841	373	108	1838	572	397	2125	621
V/C Ratio(X)	1.46	0.82	0.82	0.81	0.34	1.20	0.93	1.22	0.63	1.43	0.98	0.85
Avail Cap(c_a), veh/h	584	600	581	257	841	373	108	1838	572	397	2125	621
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.0	45.5	45.5	68.5	47.4	57.0	69.7	47.3	39.0	66.0	42.5	38.9
Incr Delay (d2), s/veh	216.9	9.2	9.4	16.0	0.2	113.6	64.6	106.2	5.3	206.2	14.5	13.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.8	18.5	18.0	4.1	4.5	25.9	5.7	40.4	12.0	18.9	27.3	19.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	278.9	54.7	54.9	84.5	47.6	170.6	134.3	153.4	44.3	272.2	57.0	52.2
LnGrp LOS	F	D	D	F	D	F	F	F	D	F	E	D
Approach Vol, veh/h		1828			922			2714			3164	
Approach Delay, s/veh		159.5			115.0			138.1			94.7	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	67.5	29.0	39.5	21.0	59.5	14.1	54.4				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5				
Max Green Setting (Gmax), s	9.0	62.5	25.0	35.0	17.0	54.5	11.0	49.0				
Max Q Clear Time (g_c+I1), s	10.3	61.9	27.0	37.0	19.0	56.5	10.0	39.8				
Green Ext Time (p_c), s	0.0	0.6	0.0	0.0	0.0	0.0	0.1	4.4				
Intersection Summary												
HCM 6th Ctrl Delay			124.3									
HCM 6th LOS			F									

HCM 6th Signalized Intersection Summary

2: Mission Boulevard & Berry Avenue

Cumulative + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	38	3	21	40	5	27	87	2182	6	64	1876	106
Future Volume (veh/h)	38	3	21	40	5	27	87	2182	6	64	1876	106
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	39	3	22	41	5	28	90	2249	6	66	1934	109
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	1	1	0	2	2
Cap, veh/h	98	14	39	93	15	43	109	2921	8	84	2673	149
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.12	1.00	1.00	0.05	0.78	0.78
Sat Flow, veh/h	850	206	553	803	217	621	1781	3665	10	1810	3417	190
Grp Volume(v), veh/h	64	0	0	74	0	0	90	1099	1156	66	995	1048
Grp Sat Flow(s), veh/h/ln	1609	0	0	1641	0	0	1781	1791	1883	1810	1777	1831
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	7.4	0.0	0.0	5.4	41.6	43.7
Cycle Q Clear(g_c), s	5.4	0.0	0.0	6.2	0.0	0.0	7.4	0.0	0.0	5.4	41.6	43.7
Prop In Lane	0.61		0.34	0.55		0.38	1.00		0.01	1.00		0.10
Lane Grp Cap(c), veh/h	151	0	0	152	0	0	109	1428	1501	84	1390	1432
V/C Ratio(X)	0.42	0.00	0.00	0.49	0.00	0.00	0.82	0.77	0.77	0.79	0.72	0.73
Avail Cap(c_a), veh/h	372	0	0	375	0	0	119	1428	1501	109	1390	1432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.4	0.0	0.0	67.7	0.0	0.0	65.0	0.0	0.0	70.8	8.1	8.3
Incr Delay (d2), s/veh	1.9	0.0	0.0	2.4	0.0	0.0	33.8	4.1	3.9	24.3	3.2	3.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.5	0.0	0.0	2.9	0.0	0.0	4.2	1.6	1.6	3.1	15.2	16.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	69.3	0.0	0.0	70.1	0.0	0.0	98.8	4.1	3.9	95.1	11.3	11.7
LnGrp LOS	E	A	A	E	A	A	F	A	A	F	B	B
Approach Vol, veh/h		64			74			2345			2109	
Approach Delay, s/veh		69.3			70.1			7.6			14.1	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	3.2	122.3		14.5	11.0	124.6		14.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	94.0			33.0	9.0	95.0		33.0				
Max Q Clear Time (g_c+1.4), s	45.7			8.2	7.4	2.0		7.4				
Green Ext Time (p_c), s	0.0	29.8		0.3	0.0	52.6		0.3				

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

HCM 6th TWSC

3: Mission Boulevard & Torrano Avenue (N)

Cumulative + Project
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	37	0	2189	1776	53
Future Vol, veh/h	0	37	0	2189	1776	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	2	2
Mvmt Flow	0	39	0	2304	1869	56
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	963	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	259	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	259	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	21.3	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	259	-	-		
HCM Lane V/C Ratio	-	0.15	-	-		
HCM Control Delay (s)	-	21.3	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.5	-	-		

HCM 6th TWSC

4: Mission Boulevard & Torrano Avenue (S)

Cumulative + Project
Timing Plan: PM

Intersection												
Int Delay, s/veh	36.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	9	7	0	21	33	2185	53	106	1778	5
Future Vol, veh/h	2	0	9	7	0	21	33	2185	53	106	1778	5
Conflicting Peds, #/hr	4	0	8	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	0	9	7	0	22	35	2300	56	112	1872	5
Major/Minor	Minor2		Minor1				Major1			Major2		
Conflicting Flow All	3323	4525	947	3566	4499	1182	1877	0	0	2356	0	0
Stage 1	2099	2099	-	2398	2398	-	-	-	-	-	-	-
Stage 2	1224	2426	-	1168	2101	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	3	1	266	~ 2	1	185	324	-	-	211	-	-
Stage 1	55	94	-	35	66	-	-	-	-	-	-	-
Stage 2	193	64	-	209	94	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 1	0	264	~ 1	0	184	324	-	-	211	-	-
Mov Cap-2 Maneuver	~ 1	0	-	~ 1	0	-	-	-	-	-	-	-
Stage 1	49	44	-	31	59	-	-	-	-	-	-	-
Stage 2	151	57	-	94	44	-	-	-	-	-	-	-
Approach	EB		WB				NB			SB		
HCM Control Delay, \$	1936.5		\$ 4582.3				0.3			2.2		
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	324	-	-	5	4	211	-	-				
HCM Lane V/C Ratio	0.107	-	-	2.316	7.368	0.529	-	-				
HCM Control Delay (s)	17.4	-	-	\$ 1936	\$ 4582.3	39.7	-	-				
HCM Lane LOS	C	-	-	F	F	E	-	-				
HCM 95th %tile Q(veh)	0.4	-	-	2.5	5.3	2.8	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

HCM 6th Signalized Intersection Summary

5: Mission Boulevard & Tennyson Road

Cumulative + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	796	29	414	18	93	9	699	1718	2	138	1235	805
Future Volume (veh/h)	796	29	414	18	93	9	699	1718	2	138	1235	805
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	812	30	422	18	95	9	713	1753	2	141	1260	821
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	745	403	342	23	119	121	587	2662	3	151	2146	666
Arrive On Green	0.22	0.22	0.22	0.08	0.08	0.08	0.17	0.51	0.51	0.08	0.42	0.42
Sat Flow, veh/h	3456	1870	1585	296	1560	1585	3456	5267	6	1781	5106	1585
Grp Volume(v), veh/h	812	30	422	113	0	9	713	1133	622	141	1260	821
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1856	0	1585	1728	1702	1869	1781	1702	1585
Q Serve(g_s), s	33.0	2.0	33.0	9.2	0.0	0.8	26.0	37.8	37.8	12.0	29.1	64.3
Cycle Q Clear(g_c), s	33.0	2.0	33.0	9.2	0.0	0.8	26.0	37.8	37.8	12.0	29.1	64.3
Prop In Lane	1.00		1.00	0.16		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	745	403	342	142	0	121	587	1720	945	151	2146	666
V/C Ratio(X)	1.09	0.07	1.23	0.80	0.00	0.07	1.21	0.66	0.66	0.93	0.59	1.23
Avail Cap(c_a), veh/h	745	403	342	400	0	342	587	1720	945	151	2146	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.0	47.8	60.0	69.5	0.0	65.6	63.5	28.1	28.1	69.6	34.1	44.3
Incr Delay (d2), s/veh	60.0	0.1	128.3	9.8	0.0	0.3	111.4	2.0	3.6	53.1	1.2	117.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.8	0.9	25.5	4.8	0.0	0.3	20.4	15.5	17.4	7.7	12.2	46.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	120.0	47.9	188.3	79.3	0.0	65.9	174.9	30.0	31.6	122.6	35.3	161.6
LnGrp LOS	F	D	F	E	A	E	F	C	C	F	D	F
Approach Vol, veh/h	1264			122			2468			2222		
Approach Delay, s/veh	141.1			78.3			72.3			87.5		
Approach LOS	F			E			E			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.0	69.3		15.7	17.0	82.3		38.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	26.0	43.0		33.0	13.0	56.0		33.0				
Max Q Clear Time (g_c+I1), s	28.0	66.3		11.2	14.0	39.8		35.0				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.0	10.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	92.3											
HCM 6th LOS	F											

HCM 6th Signalized Intersection Summary 6: Mission Boulevard & Harder Road

Cumulative + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔↔	↑↑↑		↔↔↔	↑↑↑	
Traffic Volume (veh/h)	568	643	562	226	421	77	547	1616	351	122	1286	360
Future Volume (veh/h)	568	643	562	226	421	77	547	1616	351	122	1286	360
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1885	1900	1900	1841	1885	1885	1885	1900	1870	1870
Adj Flow Rate, veh/h	598	677	592	238	443	81	576	1701	369	128	1354	379
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	0	0	4	1	1	1	0	2	2
Cap, veh/h	584	907	400	283	605	254	454	1877	401	196	1186	331
Arrive On Green	0.17	0.25	0.25	0.08	0.17	0.17	0.25	0.44	0.44	0.14	0.40	0.40
Sat Flow, veh/h	3510	3582	1581	3510	3610	1515	1795	4225	904	1810	3952	1102
Grp Volume(v), veh/h	598	677	592	238	443	81	576	1377	693	128	1165	568
Grp Sat Flow(s),veh/h/ln	1755	1791	1581	1755	1805	1515	1795	1716	1697	1810	1702	1651
Q Serve(g_s), s	25.0	26.1	38.0	10.0	17.5	7.1	37.9	55.9	57.5	10.0	45.0	45.0
Cycle Q Clear(g_c), s	25.0	26.1	38.0	10.0	17.5	7.1	37.9	55.9	57.5	10.0	45.0	45.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.67
Lane Grp Cap(c), veh/h	584	907	400	283	605	254	454	1524	754	196	1021	495
V/C Ratio(X)	1.02	0.75	1.48	0.84	0.73	0.32	1.27	0.90	0.92	0.65	1.14	1.15
Avail Cap(c_a), veh/h	584	907	400	304	770	323	454	1555	769	196	1021	495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.5	51.6	56.0	68.0	59.2	54.9	56.1	38.7	39.2	61.5	45.1	45.1
Incr Delay (d2), s/veh	43.3	3.4	228.4	17.6	2.7	0.7	137.9	9.1	18.1	7.5	75.5	87.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	12.1	40.4	5.2	8.2	2.8	34.4	25.0	27.3	4.9	28.5	29.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	105.8	55.0	284.4	85.6	61.9	55.6	194.0	47.8	57.3	69.0	120.6	132.3
LnGrp LOS	F	D	F	F	E	E	F	D	E	E	F	F
Approach Vol, veh/h	1867			762			2646			1861		
Approach Delay, s/veh	144.0			68.6			82.1			120.6		
Approach LOS	F			E			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	41.9	50.0	29.0	29.1	20.3	71.6	16.1	42.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0				
Max Green Setting (Gmax), s	37.0	45.0	19.0	32.0	14.0	68.0	13.0	38.0				
Max Q Clear Time (g_c+3.0), s	39.5	47.0	27.0	19.5	12.0	59.5	12.0	40.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.5	0.1	7.1	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	106.9											
HCM 6th LOS	F											

HCM 6th TWSC

7: Dollar Street & Harder Road

Cumulative + Project
Timing Plan: PM

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰		↰	↰	
Traffic Vol, veh/h	103	1610	121	85	1088	34	143	13	101	39	4	147
Future Vol, veh/h	103	1610	121	85	1088	34	143	13	101	39	4	147
Conflicting Peds, #/hr	4	0	9	9	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	2	4	1	0	0	0	0	3	0	0
Mvmt Flow	110	1713	129	90	1157	36	152	14	107	41	4	156
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1197	0	0	1851	0	0	2769	3384	930	2443	3430	602
Stage 1	-	-	-	-	-	-	2007	2007	-	1359	1359	-
Stage 2	-	-	-	-	-	-	762	1377	-	1084	2071	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.5	6.5	6.9	7.56	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Follow-up Hdwy	2.2	-	-	2.24	-	-	3.5	4	3.3	3.53	4	3.3
Pot Cap-1 Maneuver	590	-	-	316	-	-	~ 9	~ 8	273	~ 16	7	448
Stage 1	-	-	-	-	-	-	~ 62	105	-	155	219	-
Stage 2	-	-	-	-	-	-	368	214	-	230	97	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	588	-	-	313	-	-	-	~ 5	271	-	~ 4	446
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 5	-	-	~ 4	-
Stage 1	-	-	-	-	-	-	~ 50	85	-	126	155	-
Stage 2	-	-	-	-	-	-	165	152	-	94	78	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.5								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	-		38	588	-	-	313	-	-	-	114	
HCM Lane V/C Ratio	-		3.191	0.186	-	-	0.289	-	-	-	1.409	
HCM Control Delay (s)	\$		1208.6	12.5	-	-	21.1	-	-	-	297.4	
HCM Lane LOS	-		F	B	-	-	C	-	-	-	F	
HCM 95th %tile Q(veh)	-		13.7	0.7	-	-	1.2	-	-	-	11.2	
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM 6th Signalized Intersection Summary 8: Jane Avenue & Harder Road

Cumulative + Project
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	348	1495	24	66	1024	223	21	25	54	185	36	240
Future Volume (veh/h)	348	1495	24	66	1024	223	21	25	54	185	36	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	391	1680	27	74	1151	251	24	28	61	208	40	270
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	2028	899	96	1502	658	97	118	317	318	50	417
Arrive On Green	0.07	0.19	0.19	0.05	0.42	0.42	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1795	3582	1588	1795	3582	1570	164	451	1207	984	189	1588
Grp Volume(v), veh/h	391	1680	27	74	1151	251	38	0	75	248	0	270
Grp Sat Flow(s),veh/h/ln	1795	1791	1588	1795	1791	1570	332	0	1490	1173	0	1588
Q Serve(g_s), s	22.0	49.6	1.5	4.5	30.2	12.2	1.4	0.0	4.3	18.7	0.0	16.6
Cycle Q Clear(g_c), s	22.0	49.6	1.5	4.5	30.2	12.2	24.5	0.0	4.3	23.0	0.0	16.6
Prop In Lane	1.00		1.00	1.00		1.00	0.64		0.81	0.84		1.00
Lane Grp Cap(c), veh/h	359	2028	899	96	1502	658	141	0	391	368	0	417
V/C Ratio(X)	1.09	0.83	0.03	0.77	0.77	0.38	0.27	0.00	0.19	0.67	0.00	0.65
Avail Cap(c_a), veh/h	359	2028	899	196	1502	658	270	0	542	508	0	578
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.24	0.24	0.24	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.4	39.6	20.0	51.4	27.3	22.1	38.0	0.0	31.5	40.5	0.0	36.0
Incr Delay (d2), s/veh	51.5	1.0	0.0	12.5	3.8	1.7	1.0	0.0	0.2	2.1	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	24.0	0.5	2.3	13.2	4.7	1.0	0.0	1.6	6.6	0.0	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	102.8	40.6	20.0	63.9	31.1	23.7	39.0	0.0	31.7	42.6	0.0	37.7
LnGrp LOS	F	D	C	E	C	C	D	A	C	D	A	D
Approach Vol, veh/h	2098				1476				113		518	
Approach Delay, s/veh	51.9				31.5				34.2		40.1	
Approach LOS	D				C				C		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	67.3		32.9	26.0	51.1		32.9				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	45.0		40.0	22.0	35.0		40.0				
Max Q Clear Time (g_c+I1), s	6.5	51.6		25.0	24.0	32.2		26.5				
Green Ext Time (p_c), s	0.1	0.0		2.3	0.0	2.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay	42.8											
HCM 6th LOS	D											

HCM 6th Signalized Intersection Summary

9: Soto Road & Harder Road

Cumulative + Project
Timing Plan: PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	441	1507	153	30	1020	243	129	77	18	179	62	343
Future Volume (veh/h)	441	1507	153	30	1020	243	129	77	18	179	62	343
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	479	1638	166	33	1109	264	140	84	20	195	67	373
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	473	1672	167	62	1009	433	141	481	115	437	81	452
Arrive On Green	0.26	0.51	0.51	0.03	0.28	0.28	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1795	3274	327	1795	3582	1538	955	1471	350	1297	248	1382
Grp Volume(v), veh/h	479	884	920	33	1109	264	140	0	104	195	0	440
Grp Sat Flow(s), veh/h/ln	1795	1791	1810	1795	1791	1538	955	0	1821	1297	0	1630
Q Serve(g_s), s	29.0	52.4	55.7	2.0	31.0	16.4	8.6	0.0	4.5	13.9	0.0	27.4
Cycle Q Clear(g_c), s	29.0	52.4	55.7	2.0	31.0	16.4	36.0	0.0	4.5	18.4	0.0	27.4
Prop In Lane	1.00		0.18	1.00		1.00	1.00		0.19	1.00		0.85
Lane Grp Cap(c), veh/h	473	915	924	62	1009	433	141	0	596	437	0	534
V/C Ratio(X)	1.01	0.97	1.00	0.53	1.10	0.61	1.00	0.00	0.17	0.45	0.00	0.82
Avail Cap(c_a), veh/h	473	915	924	229	1009	433	141	0	596	437	0	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.42	0.42	0.42	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.5	26.0	26.8	52.2	39.5	34.2	52.7	0.0	26.4	33.0	0.0	34.1
Incr Delay (d2), s/veh	44.4	22.6	28.5	2.9	51.6	2.7	74.6	0.0	0.1	0.7	0.0	10.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	26.4	29.5	0.9	20.5	6.3	6.8	0.0	2.0	4.5	0.0	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.9	48.6	55.3	55.1	91.1	36.9	127.3	0.0	26.5	33.7	0.0	44.3
LnGrp LOS	F	D	E	E	F	D	F	A	C	C	A	D
Approach Vol, veh/h	2283			1406			244			635		
Approach Delay, s/veh	58.9			80.1			84.3			41.0		
Approach LOS	E			F			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	61.2		41.0	33.0	36.0		41.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	46.0	46.0		36.0	29.0	31.0		36.0				
Max Q Clear Time (g_c+14), s	57.7	57.7		29.4	31.0	33.0		38.0				
Green Ext Time (p_c), s	0.0	0.0		2.1	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 64.3
HCM 6th LOS E

HCM 6th TWSC

10: Mission Boulevard & North Driveway

Cumulative + Project
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	14	0	2456	2029	16
Future Vol, veh/h	0	14	0	2456	2029	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	15	0	2585	2136	17
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	1077	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	187	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	187	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	25.9	0	0			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	187	-	-		
HCM Lane V/C Ratio	-	0.079	-	-		
HCM Control Delay (s)	-	25.9	-	-		
HCM Lane LOS	-	D	-	-		
HCM 95th %tile Q(veh)	-	0.3	-	-		

HCM 6th TWSC

11: Mission Boulevard & South Driveway

Cumulative + Project
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑	
Traffic Vol, veh/h	0	15	18	2448	2029	15
Future Vol, veh/h	0	15	18	2448	2029	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	16	19	2577	2136	16
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1076	2152	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	218	254	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	218	254	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.8	0.1		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	254	-	218	-	-	
HCM Lane V/C Ratio	0.075	-	0.072	-	-	
HCM Control Delay (s)	20.3	-	22.8	-	-	
HCM Lane LOS	C	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	

Cumulative 2040 Plus Project Queue Worksheets

Queues

Cumulative + Project

1: Mision Boulevard & Carlos Bee Boulevard

Timing Plan: AM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	341	466	414	774	304	153	1882	199	459	2765	460
v/c Ratio	0.93	0.54	1.21	0.88	0.57	1.24	0.97	0.28	1.00	1.21	0.61
Control Delay	95.1	45.1	172.2	63.2	22.0	213.5	56.0	6.5	102.1	133.5	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	45.1	172.2	63.2	22.0	213.5	56.0	6.5	102.1	133.5	20.3
Queue Length 50th (ft)	163	183	~240	361	92	~186	619	13	~236	~1138	188
Queue Length 95th (ft)	#258	241	#350	442	192	#333	#731	65	#347	#1220	307
Internal Link Dist (ft)		743		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	366	890	341	906	537	123	1949	716	460	2287	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.52	1.21	0.85	0.57	1.24	0.97	0.28	1.00	1.21	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative + Project

2: Mision Boulevard & Berry Avenue

Timing Plan: AM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	141	36	1956	46	3195
v/c Ratio	0.89	0.45	0.46	0.84	0.53	1.36
Control Delay	87.0	43.6	84.5	23.6	87.7	190.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.0	43.6	84.5	23.6	87.7	190.6
Queue Length 50th (ft)	183	91	33	753	42	~2111
Queue Length 95th (ft)	#307	157	#78	885	#102	#2216
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	276	356	79	2326	86	2342
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.40	0.46	0.84	0.53	1.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

5: Mision Boulevard & Tennyson Road

Cumulative + Project

Timing Plan: AM

										
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	815	24	575	209	15	380	1476	49	2743	736
v/c Ratio	0.77	0.04	0.80	0.75	0.05	1.54	0.78	0.59	1.62	1.04
Control Delay	48.4	33.5	26.1	70.4	0.3	301.9	42.4	90.4	312.3	70.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	33.5	26.1	70.4	0.3	301.9	42.4	90.4	312.3	70.9
Queue Length 50th (ft)	320	14	192	177	0	~285	444	43	~1263	~521
Queue Length 95th (ft)	422	38	#371	247	0	#384	500	#103	#1326	#751
Internal Link Dist (ft)	1876			1688			894		973	
Turn Bay Length (ft)	470			225		315	500	240		210
Base Capacity (vph)	1055	572	722	445	454	247	1895	83	1695	711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.04	0.80	0.47	0.03	1.54	0.78	0.59	1.62	1.04

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

6: Mision Boulevard & Harder Road

Cumulative + Project

Timing Plan: AM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	487	414	574	277	206	80	341	1601	55	3258
v/c Ratio	0.66	0.46	1.18	1.23	0.60	0.40	1.79	0.69	0.30	1.44
Control Delay	54.9	46.0	135.7	186.2	67.5	17.6	407.9	30.8	62.4	232.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	46.0	135.7	186.2	67.5	17.6	407.9	30.8	62.4	232.5
Queue Length 50th (ft)	208	167	~527	~158	95	0	~461	437	45	~1470
Queue Length 95th (ft)	264	208	#703	#236	128	45	#622	412	91	#1438
Internal Link Dist (ft)		322			2082			357		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	740	899	486	226	814	362	191	2510	189	2259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.46	1.18	1.23	0.25	0.22	1.79	0.64	0.29	1.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

8: Jane Avenue & Harder Road

Cumulative + Project

Timing Plan: AM

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	242	1043	4	24	723	162	149	229	367
v/c Ratio	0.78	0.49	0.00	0.21	0.44	0.20	0.19	0.76	0.55
Control Delay	61.6	16.4	0.0	52.5	23.9	4.6	16.3	52.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	16.4	0.0	52.5	23.9	4.6	16.3	52.8	6.1
Queue Length 50th (ft)	182	143	0	16	184	0	23	149	0
Queue Length 95th (ft)	#271	290	m0	43	285	45	43	209	61
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	339	2146	959	194	1625	803	1091	436	805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.49	0.00	0.12	0.44	0.20	0.14	0.53	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative + Project

9: Soto Road & Harder Road

Timing Plan: AM

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	301	1217	17	1060	169	135	75	184	725
v/c Ratio	0.82	0.67	0.16	0.94	0.30	2.01	0.12	0.41	0.85
Control Delay	59.3	22.5	43.8	58.8	20.5	528.9	16.2	30.8	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	22.5	43.8	58.8	20.5	528.9	16.2	30.8	22.1
Queue Length 50th (ft)	202	284	12	300	22	~149	21	98	182
Queue Length 95th (ft)	276	422	m26	#540	102	#217	50	154	322
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	434	1826	193	1130	566	67	620	454	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.67	0.09	0.94	0.30	2.01	0.12	0.41	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative + Project

1: Mission Boulevard & Carlos Bee Boulevard

Timing Plan: PM

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	854	974	190	284	448	100	2251	363	567	2072	525
v/c Ratio	1.47	0.90	0.76	0.36	0.94	0.88	1.23	0.52	1.31	0.96	0.69
Control Delay	262.5	58.6	87.0	49.8	65.1	124.8	150.5	18.0	201.8	54.3	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	262.5	58.6	87.0	49.8	65.1	124.8	150.5	18.0	201.8	54.3	22.6
Queue Length 50th (ft)	~585	457	94	121	292	99	~987	115	~383	720	222
Queue Length 95th (ft)	#716	550	#148	166	#502	#221	#1077	215	#505	#841	368
Internal Link Dist (ft)		496		1964			424			1357	
Turn Bay Length (ft)	160		170		260	250		341	300		195
Base Capacity (vph)	581	1118	255	839	491	113	1824	700	434	2148	762
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.47	0.87	0.75	0.34	0.91	0.88	1.23	0.52	1.31	0.96	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative + Project

2: Mission Boulevard & Berry Avenue

Timing Plan: PM



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	74	90	2255	66	2043
v/c Ratio	0.58	0.62	0.57	0.82	0.50	0.78
Control Delay	69.5	70.3	75.9	30.0	79.1	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	70.3	75.9	30.0	79.1	15.2
Queue Length 50th (ft)	46	53	79	1087	63	566
Queue Length 95th (ft)	95	106	m87	m1230	113	854
Internal Link Dist (ft)	663	146		893		723
Turn Bay Length (ft)			257		142	
Base Capacity (vph)	303	323	162	2740	137	2628
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.23	0.56	0.82	0.48	0.78

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

Cumulative + Project

5: Mission Boulevard & Tennyson Road

Timing Plan: PM

										
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	812	30	422	113	9	713	1755	141	1260	821
v/c Ratio	0.74	0.05	0.53	0.54	0.03	1.22	0.94	0.94	0.88	0.98
Control Delay	51.7	40.8	6.7	71.9	0.2	166.0	58.1	126.8	60.9	44.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	40.8	6.7	71.9	0.2	166.0	58.1	126.8	60.9	44.5
Queue Length 50th (ft)	364	20	0	111	0	~449	620	143	443	364
Queue Length 95th (ft)	#602	55	98	156	0	#577	#702	#283	505	#674
Internal Link Dist (ft)	1876			1698			1191			950
Turn Bay Length (ft)	470	225			315	500	240			210
Base Capacity (vph)	1092	592	791	398	425	583	1861	150	1429	838
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.05	0.53	0.28	0.02	1.22	0.94	0.94	0.88	0.98

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

Cumulative + Project

6: Mission Boulevard & Harder Road

Timing Plan: PM

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	598	677	592	238	443	81	576	2070	128	1733
v/c Ratio	0.96	0.80	0.88	0.66	0.76	0.22	1.31	0.91	0.76	1.15
Control Delay	87.4	61.4	33.7	75.0	68.5	1.4	198.4	44.4	76.9	112.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	61.4	33.7	75.0	68.5	1.4	198.4	44.4	76.9	112.2
Queue Length 50th (ft)	303	323	210	119	220	0	~721	670	125	~716
Queue Length 95th (ft)	#499	397	#435	#182	270	1	#957	742	m163	#804
Internal Link Dist (ft)		322			2082			387		1414
Turn Bay Length (ft)	100		280	240		140	530		250	
Base Capacity (vph)	623	905	688	358	770	435	440	2279	169	1512
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.75	0.86	0.66	0.58	0.19	1.31	0.91	0.76	1.15

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

8: Jane Avenue & Harder Road

Cumulative + Project

Timing Plan: PM

									
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	391	1680	27	74	1151	251	113	248	270
v/c Ratio	0.76	0.84	0.03	0.46	0.94	0.37	0.15	0.77	0.45
Control Delay	51.0	28.6	6.9	56.2	50.9	7.3	14.4	53.4	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	28.6	6.9	56.2	50.9	7.3	14.4	53.4	5.8
Queue Length 50th (ft)	289	418	0	50	423	16	14	163	0
Queue Length 95th (ft)	m#349	m#760	m2	94	#573	73	32	222	53
Internal Link Dist (ft)		1639			739		683	460	
Turn Bay Length (ft)	240			100					
Base Capacity (vph)	513	1998	881	199	1226	685	1069	464	743
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.84	0.03	0.37	0.94	0.37	0.11	0.53	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues

9: Soto Road & Harder Road

Cumulative + Project

Timing Plan: PM

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	479	1804	33	1109	264	140	104	195	440
v/c Ratio	0.99	0.98	0.27	1.10	0.45	1.01	0.18	0.47	0.62
Control Delay	80.6	45.2	34.7	113.2	32.7	117.3	24.3	34.1	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	45.2	34.7	113.2	32.7	117.3	24.3	34.1	15.6
Queue Length 50th (ft)	~349	~743	24	~484	120	98	46	109	94
Queue Length 95th (ft)	#562	#917	m31	m#558	m145	#228	88	179	202
Internal Link Dist (ft)		581		1639			888		1481
Turn Bay Length (ft)	294		97			112		150	
Base Capacity (vph)	482	1833	227	1007	582	142	604	423	719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.98	0.15	1.10	0.45	0.99	0.17	0.46	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Cumulative Plus Project with Test Improvements LOS Worksheets

HCM 6th TWSC

4: Mision Boulevard & Torrano Ave (S)

Cumulative + Project: Test Improvements

Timing Plan: AM

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↰			↰	↰↱	↱↰		↰↱	↱↰	
Traffic Vol, veh/h	0	0	1	0	0	30	15	1771	23	86	2778	2
Future Vol, veh/h	0	0	1	0	0	30	15	1771	23	86	2778	2
Conflicting Peds, #/hr	22	0	14	2	0	10	14	0	2	10	0	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	6	0	3	0
Mvmt Flow	0	0	1	0	0	32	16	1904	25	92	2987	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	1531	-	-	985	3011	0	0	1939	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	0	0	108	0	0	251	116	-	-	307	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	104	-	-	246	114	-	-	304	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	40		21.8		0.3		0.7					
HCM LOS	E		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	114	-	-	104	246	304	-	-				
HCM Lane V/C Ratio	0.141	-	-	0.01	0.131	0.304	-	-				
HCM Control Delay (s)	41.7	-	-	40	21.8	21.9	-	-				
HCM Lane LOS	E	-	-	E	C	C	-	-				
HCM 95th %tile Q(veh)	0.5	-	-	0	0.4	1.3	-	-				

Cumulative 2040 Plus Project Peak Hour Signal Warrants



KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Mission&Torrano
 S\25541_Signal-Warrant_Mission&Torrano
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Cumulative+Project AM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
8:00 AM	9:00 AM	1819	2875	1	39
2nd Highest Hour		1722	2722	1	35
3rd Highest Hour		1698	2683	1	30
4th Highest Hour		1625	2568	1	30
5th Highest Hour		1601	2530	1	26
6th Highest Hour		1601	2530	1	26
7th Highest Hour		1528	2415	1	25
8th Highest Hour		1504	2377	1	23
9th Highest Hour		1455	2300	1	22
10th Highest Hour		1358	2147	1	21
11th Highest Hour		1310	2070	1	21
12th Highest Hour		1285	2032	1	21
13th Highest Hour		1237	1955	1	20
14th Highest Hour		1067	1687	0	17
15th Highest Hour		849	1342	0	16
16th Highest Hour		800	1265	0	12
17th Highest Hour		558	882	0	12
18th Highest Hour		461	728	0	8
19th Highest Hour		243	383	0	5
20th Highest Hour		170	268	0	4
21st Highest Hour		146	230	0	2
22nd Highest Hour		97	153	0	2
23rd Highest Hour		49	77	0	2
24th Highest Hour		49	77	0	1

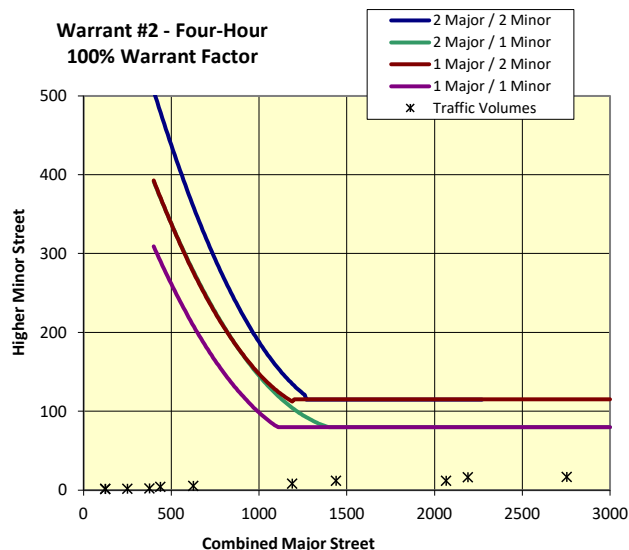
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

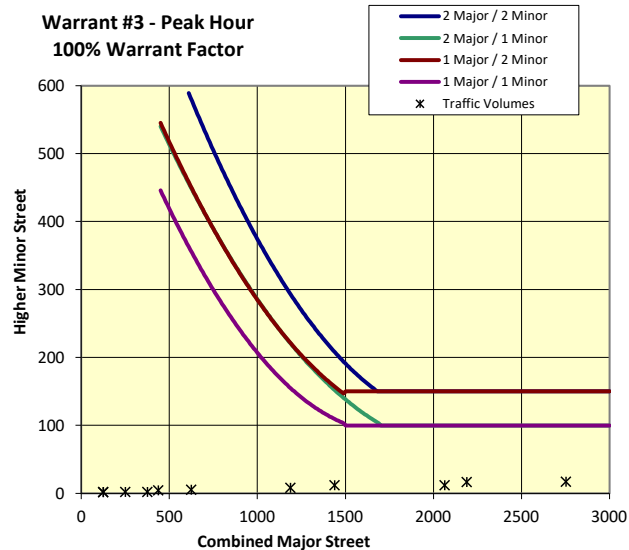
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Mission&Torrano
 S\25541_Signal-Warrant_Mission&Torrano S_EX+Proi
Intersection: Mission Boulevard & Torrano Avenue (South)
Scenario: Cumulative+Project PM Peak

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
5:00 PM	6:00 PM	2291	1907	11	28
2nd Highest Hour		2169	1805	10	25
3rd Highest Hour		2138	1780	9	22
4th Highest Hour		2047	1704	8	21
5th Highest Hour		2016	1678	7	19
6th Highest Hour		2016	1678	7	19
7th Highest Hour		1924	1602	7	18
8th Highest Hour		1894	1576	7	17
9th Highest Hour		1833	1526	6	16
10th Highest Hour		1711	1424	6	15
11th Highest Hour		1650	1373	6	15
12th Highest Hour		1619	1348	6	15
13th Highest Hour		1558	1297	6	14
14th Highest Hour		1344	1119	5	12
15th Highest Hour		1069	890	5	12
16th Highest Hour		1008	839	3	8
17th Highest Hour		703	585	3	8
18th Highest Hour		580	483	2	6
19th Highest Hour		305	254	1	4
20th Highest Hour		214	178	1	3
21st Highest Hour		183	153	1	2
22nd Highest Hour		122	102	0	1
23rd Highest Hour		61	51	0	1
24th Highest Hour		61	51	0	1

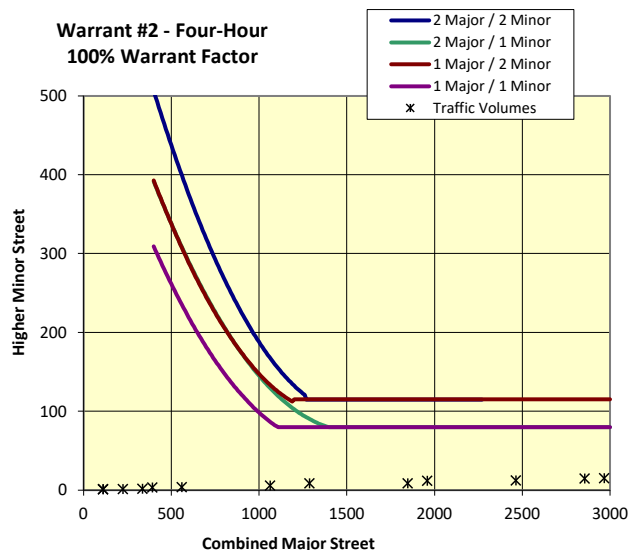
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

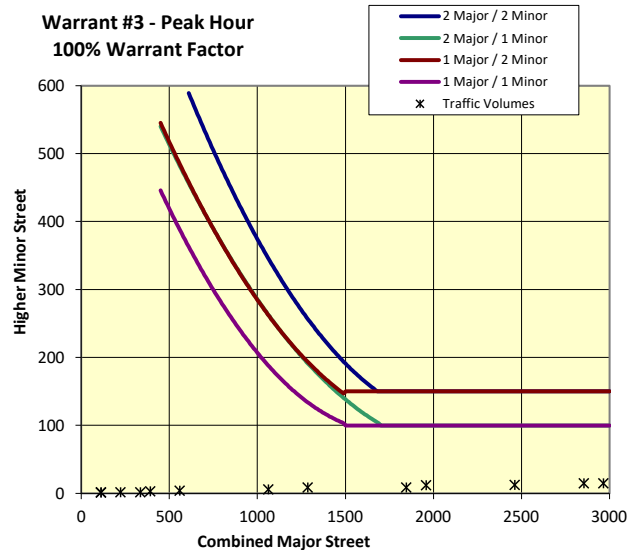
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	No
	B	900	75	0	No	No
80%	A	480	120	0	No	No
	B	720	60	0	No	No
70%	A	420	105	0	No	No
	B	630	53	0	No	No
56%	A	336	84	0	No	No
	B	504	42	0	No	No

Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-
 24\25541 Signal-Warrant Harder&Dollar CUM+Proi
Intersection: Harder Road & Dollar Street
Scenario: Cumulative + Project AM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:00 AM	8:00 AM	1247	638	175	392
2nd Highest Hour		1180	604	156	350
3rd Highest Hour		1164	595	135	303
4th Highest Hour		1114	570	134	299
5th Highest Hour		1097	561	119	266
6th Highest Hour		1097	561	117	261
7th Highest Hour		1047	536	113	253
8th Highest Hour		1031	527	103	232
9th Highest Hour		998	510	98	219
10th Highest Hour		931	476	94	211
11th Highest Hour		898	459	92	207
12th Highest Hour		881	451	92	207
13th Highest Hour		848	434	90	202
14th Highest Hour		732	374	75	169
15th Highest Hour		582	298	73	164
16th Highest Hour		549	281	53	118
17th Highest Hour		382	196	53	118
18th Highest Hour		316	162	36	80
19th Highest Hour		166	85	23	51
20th Highest Hour		116	60	19	42
21st Highest Hour		100	51	9	21
22nd Highest Hour		67	34	8	17
23rd Highest Hour		33	17	8	17
24th Highest Hour		33	17	6	13

Warrant Summary

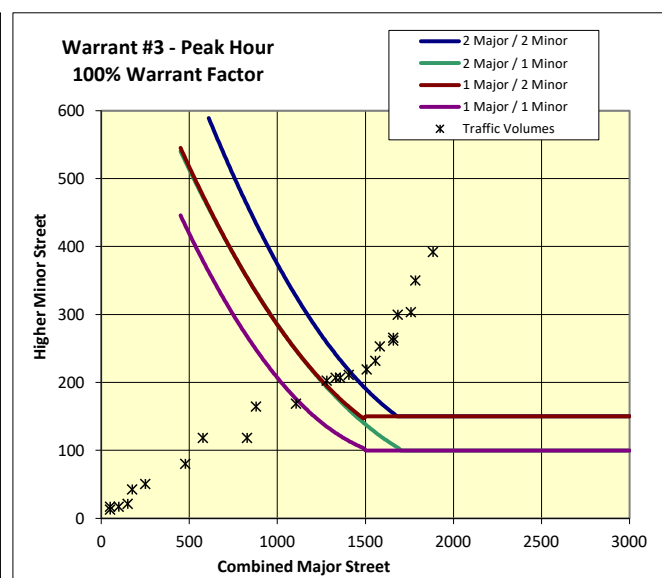
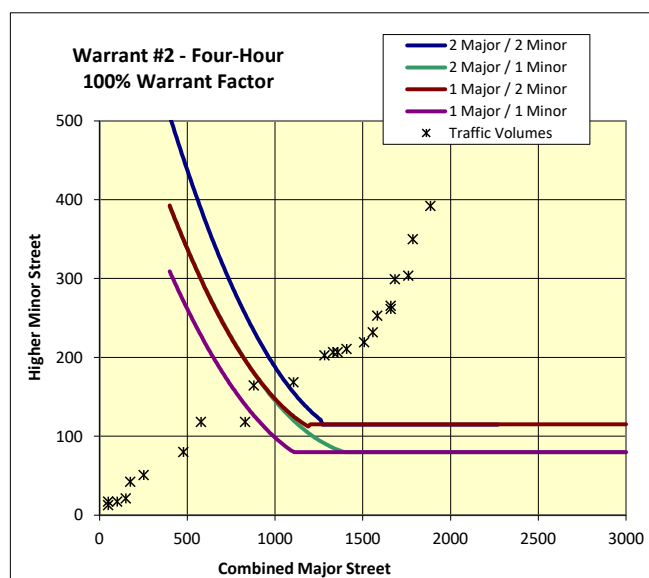
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	15	Yes	Yes
	B	900	75	14	Yes	
80%	A	480	120	15	Yes	Yes
	B	720	60	16	Yes	
70%	A	420	105	17	Yes	Yes
	B	630	53	16	Yes	
56%	A	336	84	17	Yes	Yes
	B	504	42	17	Yes	





KITTELSON & ASSOCIATES, INC.
 610 SW Alder, Suite 700
 Portland, Oregon 97205
 (503) 228-5230

Project #: 25541
Project Name: Hayward Kmart Development
Analyst: Mike Alston
Date: 1/28/2021
File: H:\25\25541 - Hayward Kmart Site Development
 EIR\analysis\signal warrants\Harder&Dollar\1-24\25541 Signal-Warrant Harder&Dollar CUM+Proi
Intersection: Harder Road & Dollar Street
Scenario: Cumulative + Project PM Peak

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	1860	1227	250	193
2nd Highest Hour		1761	1162	223	172
3rd Highest Hour		1736	1145	194	149
4th Highest Hour		1662	1096	191	147
5th Highest Hour		1637	1080	169	131
6th Highest Hour		1637	1080	167	129
7th Highest Hour		1562	1031	161	125
8th Highest Hour		1538	1014	148	114
9th Highest Hour		1488	982	140	108
10th Highest Hour		1389	916	134	104
11th Highest Hour		1339	883	132	102
12th Highest Hour		1314	867	132	102
13th Highest Hour		1265	834	129	100
14th Highest Hour		1091	720	108	83
15th Highest Hour		868	573	105	81
16th Highest Hour		818	540	75	58
17th Highest Hour		570	376	75	58
18th Highest Hour		471	311	51	39
19th Highest Hour		248	164	32	25
20th Highest Hour		174	115	27	21
21st Highest Hour		149	98	13	10
22nd Highest Hour		99	65	11	8
23rd Highest Hour		50	33	11	8
24th Highest Hour		50	33	8	6

Warrant Summary

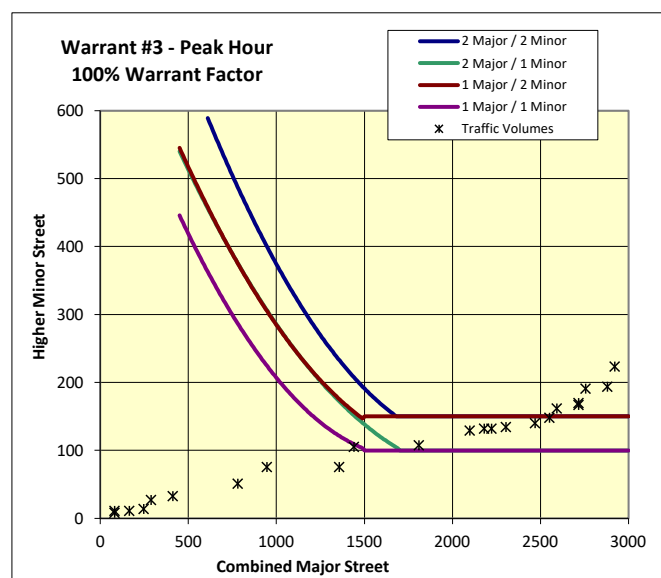
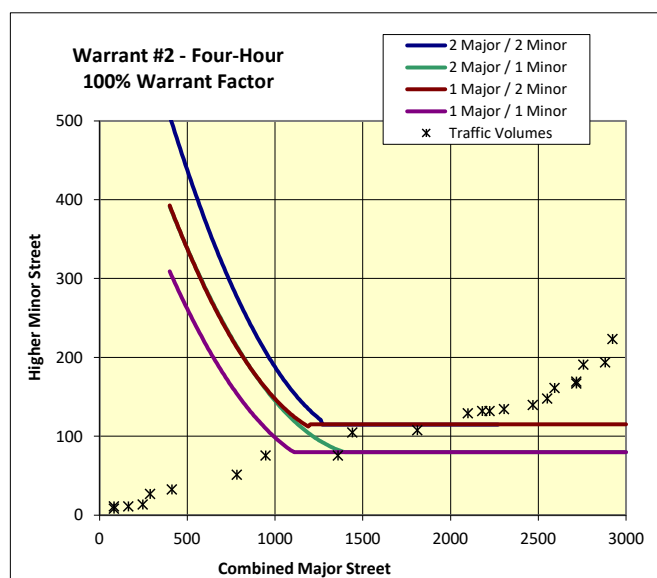
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	7	No	Yes
	B	900	75	17	Yes	
80%	A	480	120	13	Yes	Yes
	B	720	60	17	Yes	
70%	A	420	105	15	Yes	Yes
	B	630	53	17	Yes	
56%	A	336	84	15	Yes	Yes
	B	504	42	18	Yes	



Appendix 7 Alameda CTC Development
Review Complete Streets
Checklist

Development Review Complete Streets Checklist

This checklist is designed to assist the applicant and jurisdiction staff identify and assess a range of Complete Streets-related needs in the vicinity of each development. These needs, if addressed, would better serve the multimodal transportation needs of those coming and going from the site and the surrounding area. The checklist is to be completed during the pre-application phase, but can be used as a reference throughout the development and design of the project. Following completion of the checklist, staff will identify and document project modifications for further evaluation and discussion.

Project Name: Hayward Retail Center Project Description / Project Type: Retail
 Project Location :26231 Mission Boulevard, Hayward, California
 Project Manager: Mike Alston, Kittelson & Associates, Inc.
 Anticipated construction date: 2022

Pre-Application Phase

Project Description

- What are the proposed land uses (check all that apply)?
☐ residential ☒ commercial /mixed use ☐ industrial
☐ civic/institutional ☐ other: Click or tap here to enter text.
- What are the major trip generators near the project site, if any?
 (existing and future)
 - Schools ☒ yes ☐ no
 - Major employers ☒ yes ☐ no
 - Civic/community destinations ☒ yes ☐ no
 - Medium to high-density residential ☒ yes ☐ no
 - Senior centers/healthcare facilities ☐ yes ☒ no
 - Daily needs (grocery, retail, etc.) ☒ yes ☐ no
 - Other: Click or tap here to enter text.
- Is the project site located on the path to/from nearby trip generators?
☒ yes ☐ no
 Explain: Mission Blvd. is a state route east of the project site.
- Based on the modal priority maps (available at <https://alameda-ctc.maps.arcgis.com/apps/View/index.html?appid=2040175145de4305a5f59c6e82ca16c7>), list the modal priorities on adjacent streets (check all that apply):

Adjacent Street 1 Name: Mission Boulevard

Auto	☒ First	☐ Second	☐ Other
Bicycle	☐ First	☒ Second	☐ Other
Pedestrian	☐ First	☐ Second	☐ Other
Transit	☐ First	☐ Second	☐ Other
Trucks	☐ First	☐ Second	☐ Other

Adjacent Street 2 Name: Harder Road

Auto	☐ First	☐ Second	☐ Other
Bicycle	☒ First	☐ Second	☐ Other
Pedestrian	☐ First	☒ Second	☐ Other
Transit	☐ First	☐ Second	☐ Other
Trucks	☐ First	☐ Second	☐ Other

Adjacent Street 3 Name: Click or tap here to enter text.

Auto	☐ First	☐ Second	☐ Other
Bicycle	☐ First	☐ Second	☐ Other
Pedestrian	☐ First	☐ Second	☐ Other
Transit	☐ First	☐ Second	☐ Other
Trucks	☐ First	☐ Second	☐ Other

Work with Transportation and Engineering Staff to fill out questions 5-8.

5. Within the past five years, have there been any fatal or severe injury collisions within ¼ mile of the site? ☒ yes ☐ no

If yes, explain: Broadside fatal crash occurred on roadway 1,075 feet south of Mission Boulevard and Harder Road. Fatal crash occurred south of the project site.

6. Within the past five years, have there been any collisions within ¼ mile of the site involving pedestrians or bicyclists? ☒ yes ☐ no

If yes, explain: Eight crashes involved pedestrians and one crash involved a bicyclist. One pedestrian related crash was a fatal crash.

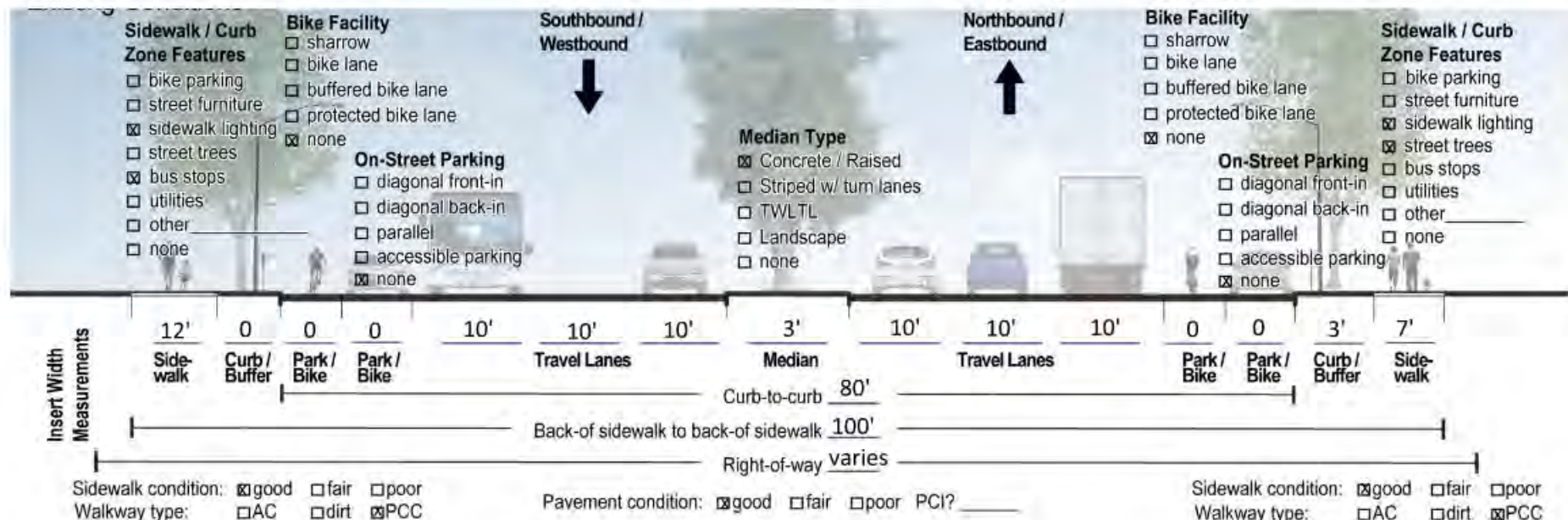
7. Have you observed other opportunities to improve safety performance? (based on field observation) ☐ yes ☐ no

If yes, note: Pedestrian crossings on Harder Road in the project vicinity are limited to signalized intersections and one improved crossing at Franklin Avenue--four crossing locations in about 3,000 feet (one every 750 feet). The crossings at Franklin Avenue and Mission Boulevard are high-visibility continental crossings; the crossings at Soto Road and Jane Avenue are basic transverse crossings striped yellow for school proximity. More frequent crossing opportunities would improve pedestrian accessibility and safety. Harder Road includes on-street Class II bicycle lanes but but 2020 Hayward Bicycle and Pedestrian Master Plan recommends separated Class IV bicycle lanes which would improve comfort and safety. The Plan also recommends Class IV bicycle lanes on Mission Boulevard, which does not include any bicycle facilities in the study area.

Existing Physical Conditions

8. What are the existing right-of-way elements adjacent to the project site? Use cross section graphic for each street adjacent to the site.

Adjacent Street 1 name: Mission Boulevard



Adjacent Street 2 name: Harder Road

Southbound / Westbound				Northbound / Eastbound											
Sidewalk / Curb Zone Features ☐ bike parking ☐ street furniture ☐ sidewalk lighting ☐ street trees ☐ bus stops ☐ utilities ☐ other ☒ none		Bike Facility ☐ sharrow ☒ bike lane ☐ buffered bike lane ☐ protected bike lane ☐ none		On-Street Parking ☐ diagonal front-in ☐ diagonal back-in ☐ parallel ☐ accessible parking ☒ none		Median Type ☒ Concrete / Raised ☐ Striped w/ turn lanes ☐ TWLTL ☐ Landscape ☐ none		Bike Facility ☐ sharrow ☒ bike lane ☐ buffered bike lane ☐ protected bike lane ☐ none		On-Street Parking ☐ diagonal front-in ☐ diagonal back-in ☐ parallel ☐ accessible parking ☒ none		Sidewalk / Curb Zone Features ☐ bike parking ☐ street furniture ☐ sidewalk lighting ☐ street trees ☐ bus stops ☐ utilities ☐ other ☒ none			
7'	0	6'	0	16'	12'	0	varies	0	12'	16'	0	6'	0	7'	
Side-walk		Curb / Buffer		Park / Bike		Park / Bike		Travel Lanes		Median		Travel Lanes		Side-walk	
Curb-to-curb 89'															
Back-of sidewalk to back-of sidewalk 105'															
Right-of-way varies															
Sidewalk condition: ☒ good ☐ fair ☐ poor Walkway type: ☐ AC ☐ dirt ☒ PCC				Pavement condition: ☒ good ☐ fair ☐ poor PCI? ____				Sidewalk condition: ☒ good ☐ fair ☐ poor Walkway type: ☐ AC ☐ dirt ☒ PCC							

Adjacent Street 3: Street name [Click or tap here to enter text.](#)

Southbound / Westbound				Northbound / Eastbound											
Sidewalk / Curb Zone Features ☐ bike parking ☐ street furniture ☐ sidewalk lighting ☐ street trees ☐ bus stops ☐ utilities ☐ other ☐ none		Bike Facility ☐ sharrow ☐ bike lane ☐ buffered bike lane ☐ protected bike lane ☐ none		On-Street Parking ☐ diagonal front-in ☐ diagonal back-in ☐ parallel ☐ accessible parking ☐ none		Median Type ☐ Concrete / Raised ☐ Striped w/ turn lanes ☐ TWLTL ☐ Landscape ☐ none		Bike Facility ☐ sharrow ☐ bike lane ☐ buffered bike lane ☐ protected bike lane ☐ none		On-Street Parking ☐ diagonal front-in ☐ diagonal back-in ☐ parallel ☐ accessible parking ☐ none		Sidewalk / Curb Zone Features ☐ bike parking ☐ street furniture ☐ sidewalk lighting ☐ street trees ☐ bus stops ☐ utilities ☐ other ☐ none			
Side-walk		Curb / Buffer		Park / Bike		Park / Bike		Travel Lanes		Median		Travel Lanes		Side-walk	
Curb-to-curb ____															
Back-of sidewalk to back-of sidewalk ____															
Right-of-way ____															
Sidewalk condition: ☐ good ☐ fair ☐ poor Walkway type: ☐ AC ☐ dirt ☐ PCC				Pavement condition: ☐ good ☐ fair ☐ poor PCI? ____				Sidewalk condition: ☐ good ☐ fair ☐ poor Walkway type: ☐ AC ☐ dirt ☐ PCC							

Plans, Policies, Guidelines, and Standards

9. What are **relevant ongoing or existing plans**?

Plan	Identified Needs (yes or no)				
	Ped	Bike	Transit	Vehicular	Other
Bicycle and Pedestrian Master Plan	☒ yes ☐ no	☒ yes ☐ no	☒ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no
Click or tap here to enter text.	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no
Click or tap here to enter text.	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no
Click or tap here to enter text.	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no
Click or tap here to enter text.	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no

List any transportation improvement needs identified in the plan documents listed above:

Bicycle and Pedestrian Master Plan was completed in 2020.

The Plan designates the following roadways as Pedestrian High Injury Corridors:

- Harder Road between Soto Road and Jane Avenue
- Mission Boulevard between Webster Street and Tennyson Road

Class IV bicycle facilities are recommended along Mission Boulevard and Harder Road.

Transportation Evaluation

10. Indicate whether the following elements have been evaluated for existing conditions at the site and surrounding area and list the result for each mode:

Pedestrian

Internal site circulation and pedestrian routes	☒ yes	☐ no
Site access and street frontage	☒ yes	☐ no
Signage and wayfinding	☐ yes	☒ no
Intersections and street crossings	☒ yes	☐ no
Access to/from surrounding area	☒ yes	☐ no
Lighting	☐ yes	☒ no
ADA facilities	☒ yes	☐ no
Other: Click or tap here to enter text.	☐ yes	☐ no

List any pedestrian deficiencies identified:

No marked pedestrian crossing across Harder Road to project site.

Bicycle

Parking supply and ease of use	☐ yes	☒ no
Site access	☒ yes	☐ no
Signage and wayfinding	☐ yes	☒ no
Intersections	☒ yes	☐ no
Access to/from surrounding area	☒ yes	☐ no
Other: Click or tap here to enter text.	☐ yes	☐ no

List any bicycle deficiencies identified:

No bicycle facilities along Mission Boulevard.

No bicycle intersection treatments at Harder Road & Dollar Street (project entrance).

Auto

- On-street parking ☐ yes ☒ no
- Off-street parking ☒ yes ☐ no
- Disabled parking ☒ yes ☐ no
- Green infrastructure ☒ yes ☐ no
- Driveway placement and ped/bike conflict points ☒ yes ☐ no
- Other: Click or tap here to enter text. ☐ yes ☐ no

List any auto deficiencies identified:

Click or tap here to enter text.

Transit

- Bus stop placement ☒ yes ☐ no
- Waiting area amenities and stop design parameters ☒ yes ☐ no
- Other: Click or tap here to enter text. ☐ yes ☐ no

List any transit deficiencies identified:

No covered waiting area for SB transit stop on Mission Boulevard

Trucks and Heavy Vehicles

- Curbside loading areas ☐ yes ☒ no
- On-site loading areas ☐ yes ☒ no
- Turning radii ☐ yes ☒ no
- Emergency vehicle access ☐ yes ☒ no
- Other: Click or tap here to enter text. ☐ yes ☐ no

List any truck/heavy vehicle deficiencies identified:

Click or tap here to enter text.

11. How does the proposed **site design** impact conditions for each mode? If negative or positive, note the impact. (Note: both negative and positive impacts could be found for one mode.)

Mode	Impacts	
Auto	☐ positive ☐ neutral ☒ negative	Increased delay at Harder Road & Dollar Street plus peak hour signal warrant met
Bicycle	☐ positive ☐ neutral ☒ negative	Without improvement at Harder Road & Dollar Street, increased conflicts at project driveway. With signalization improvement, neutral or positive.
Pedestrian	☐ positive ☒ neutral ☐ negative	Without improvement at Harder Road & Dollar Street, increased conflicts at project driveway. With signalization improvement, neutral or positive.
Transit	☐ positive ☐ neutral ☒ negative	Increased delay at Mission Boulevard & Harder Road (intersection serves AC Transit lines 99 and 801)
Trucks	☐ positive ☒ neutral ☐ negative	.
Other mode?	☐ positive ☐ neutral ☐ negative	

Other mode?	☐ positive ☐ neutral ☐ negative	Click or tap here to enter text.
-------------	--	----------------------------------

External Agency/Stakeholder Coordination

12. List agencies requiring coordination:

Agency	Has coordination occurred? Note any issues that are outstanding.
AC Transit	☐ yes ☒ no
Click or tap here to enter text.	☐ yes ☐ no
Click or tap here to enter text.	☐ yes ☐ no

This project is not expected to need stakeholder coordination.

Maintenance and Construction Phase Considerations

13. How will access for all modes be maintained during construction (check one box per mode)?

Agency	Auto	Bicycle	Pedestrian	Transit	Trucks
Detour for duration of project	☐	☐	☐	☐	☐
Time-of-day closures only (e.g. nighttime)	☐	☐	☐	☐	☐
Short-term closures (e.g. 24 hour) with detour route	☐	☐	☐	☐	☐
Access maintained with reduced facilities*	☐	☐	☐	☐	☐
Full access maintained (work does not impact mode)	☒	☒	☒	☒	☒
Other	☐	☐	☐	☐	☐

*"Access maintained with reduced facilities" could mean some travel lanes closed for vehicles; could mean bicycle lane is closed, with signage for bicycles to share travel lane; could mean that sidewalk is closed with pedestrian space provided on shoulder; could mean that some transit stops are closed; etc.)

14. Will any transportation facilities or street elements be privately maintained? ☐ yes ☒ no

If yes, explain: Click or tap here to enter text.

15. Will Complete Streets design be applied on privately maintained facilities? ☐ yes ☒ no

Appendix 8 Traffic Simulation Memorandum

a155 Grand Avenue, Suite 505
Oakland, CA 94612
P 510.839.1742 F 510.839.0871

May 3, 2021

Project# 25541

To: Steven Chang, Transportation Planner
City of Hayward

From: Mike Alston, RSP; Damian Stefanakis; Felipe Ladron de Guevara, PhD

RE: Hayward Retail Center Traffic Signal Simulations

INTRODUCTION AND KEY FINDINGS

A local transportation assessment (LTA) was conducted for the proposed Hayward Retail Center project (project) located in Hayward, California (City). The project is located at the former Kmart site at 26231 Mission Boulevard at the southwest corner of Mission Boulevard & Harder Road (assessor's parcel number 452-0020-009-01). The project would consist of:

- An approximately 3,267 square-foot drive-through restaurant
- An approximately 3,879 square-foot drive-through restaurant
- An approximately 88,000 square-foot commercial building, subdivided into nine tenants ranging from approximately 1,800 square feet to approximately 32,000 square feet

The LTA found the Harder Road & Dollar Street intersection to operate below the City's level-of-service standards (LOS E or better) and to meet peak hour signal warrants in all analysis scenarios. The LTA thus included a recommendation to install a traffic signal at the Harder Road/Dollar Street (Harder/Dollar) intersection. With signalization, the intersection was projected to operate within City LOS standards. Per discussions with City Engineering staff and based on the LTA findings, additional analysis was necessary to analyze the feasibility of adding the recommended traffic signal. This memorandum presents the feasibility analysis and recommendations for signal timing, coordination, and design.

This analysis described in this memorandum tested the operational effects of installing a traffic signal at Harder/Dollar as proposed in the project LTA based on the City's operations thresholds. Simulations of site access were limited to the Harder/Dollar access and did not include the driveways along Mission Boulevard. This memorandum concludes that from an operational standpoint, a traffic signal is feasible. The memorandum includes recommendations to minimize potential operational effects and improve conditions for all users at the site. Those recommendations are listed on page 16.

The memorandum is organized as follows:

- Background and Key Issues
- Analysis Methodology
- Feasibility Evaluation
- Recommendations

BACKGROUND AND KEY ISSUES

The LTA analyzed Harder/Dollar and the nearby Mission Boulevard & Harder Street (Mission/Harder) intersections in the following analysis scenarios (weekday AM and PM peak hours):

- Existing Conditions
- Existing Plus Project Conditions
- Cumulative Conditions
- Cumulative Plus Project Conditions

The Harder/Dollar intersection is a two-way stop control intersection with stop control on the north and south legs (Dollar Street and the project driveway, respectively). The intersection would be one of three access points to the project site. The intersection was found to operate below the City's LOS standards (with an LOS score of F) and was found to meet the peak hour signal warrant in all analysis scenarios.

The LTA included a recommendation to install a traffic signal at Harder Road & Dollar Street (see Figure 1). With signalization, the intersection is projected to operate within City level-of-service (LOS) standards. Signalization would also provide an opportunity for an additional controlled pedestrian crossing of Harder Road that would improve pedestrian access to and from the project site.

The Harder/Dollar intersection is about 375 feet west of a signalized intersection with Mission Boulevard and includes a westbound left-turn pocket just under 100 feet in length. Operations at the Harder/Dollar intersection could result in negative spillover effects at Mission/Harder (and vice versa). In particular, a traffic signal at Harder/Dollar (which would require drivers on Harder Street to stop during red signal phases) could introduce some of the effects described below.

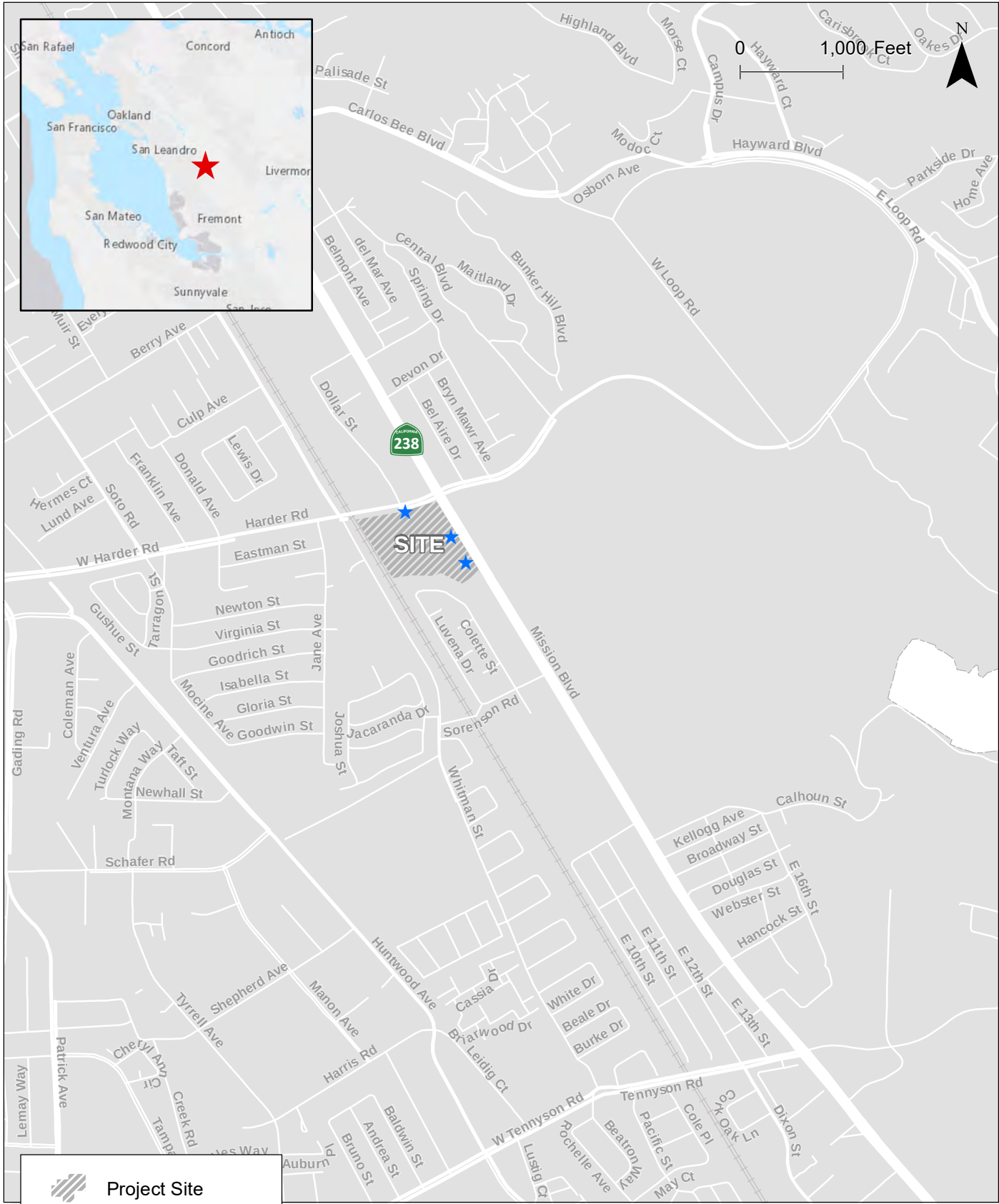
- Westbound queuing at Harder/Dollar spilling back to the Mission/Harder intersection, blocking access for conflicting movements at the Mission/Harder intersection.
- Eastbound queuing at Mission/Harder spilling back into the Harder/Dollar intersection, blocking access for conflicting movements at the Harder/Dollar intersection. The potential for this conflict already exists without the traffic signal, but such queuing could conflict with dedicated green phases on Dollar Street intended to serve traffic northbound and southbound trips.
- Any of the potential queuing spillover could cause vehicles to block crosswalks and preclude pedestrian access.

Queuing on the northbound Dollar Street approaches is of less concern for the feasibility of a signal for three reasons. First, queues on either approach would not extend back to adjacent nearby intersections. Second, for the northbound approach, any queuing would be contained within the project site rather than on public right-of-way. Third, a signal would almost certainly improve queuing along Dollar Street compared to the existing stop control, especially during the peak hours analyzed.

The project site features retail, so site access for large trucks (i.e., AASHTO WB-67 or other trucks larger than a 30- or 40-foot long single unit truck) would be required. The ability for large trucks to access the site using Harder/Dollar is of interest, although alternate access would also be provided along Mission Boulevard.

Notwithstanding the potential effects listed above, a traffic signal would improve service for minor street movements by providing a dedicated signal phase. This would provide benefit to drivers accessing the project site or accessing the commercial properties and residential development along Dollar Street north of Harder Road (whose main access point is the Harder/Dollar intersection). A signal also brings potential benefits to pedestrians and people biking with respect to access, safety, and comfort as described in subsequent sections of this memorandum.

H:\2525541 - Hayward Kmart Site Development\ER\GIS\Figure 01 Study Area and Project Site_25541_v3.mxd - garsky - 6:06 PM 1/22/2021



**Study Area and Project Site
Hayward, California**

**Figure
1**

The analysis presented in subsequent sections of this memorandum uses traffic simulation and a number of performance measures to determine the feasibility of a traffic signal at Harder/Dollar, as well as any operational and safety effects.

ANALYSIS METHODOLOGY

For the LTA analysis, Kittelson conducted static traffic operations analysis using Synchro. For this more detailed feasibility analysis, Kittelson conducted traffic simulation using SimTraffic software. Simulation provides more robust results than a static analysis because it provides a more accurate representation of random fluctuation throughout the peak analysis period and the resulting queueing conditions that would occur, as well as the interrelationship between intersections related to signal timing between and among intersections.

The following scenarios were modeled with simulation:

- Existing Conditions weekday AM peak hour and weekday PM peak hour
- Existing Plus Project Conditions weekday AM peak hour and weekday PM peak hour

Simulation analysis models were developed for each scenario using the static analysis models from the LTA analysis as a basis. The Existing Conditions models match the existing lane configuration and geometry. Field visits were conducted in the AM and PM peak period on Thursday, February 25, 2021, to calibrate the simulation model to observed field conditions (e.g., lane utilizations, pedestrian activity, signal operations, driveway activity and queue lengths in the peak hours).¹ The Existing Conditions AM and PM peak hour simulation models were first run with the existing stop-control configuration at Harder/Dollar to calibrate the simulation model to existing conditions. The Harder/Dollar intersection was then modeled as a traffic signal for both Existing and Existing Plus Project conditions to evaluate feasibility. Inputs, assumptions, and evaluation measures are discussed below.

ANALYSIS ASSUMPTIONS

The following assumptions were used to conduct the simulation analysis:

- Signal timing. The Mission/Harder intersection is on a coordinated system (SCATS system) with other signals along Mission Boulevard. The signal at this intersection uses an adaptive signal timing system, with the signal cycle length adjusting as demand changes throughout the day along Mission Boulevard. For the purposes of SimTraffic modeling, two assumptions were made:
 1. The average peak hour cycle length was modeled at Mission/Harder: 139 seconds in the AM peak hour and 150 seconds in the PM peak hour.
 2. The Harder/Dollar intersection was modeled as part of the coordinated system that includes Mission/Harder. The intent of the coordination is to provide eastbound and westbound progression along Harder Road to assist in preventing the potential feasibility concerns described in the previous section.

¹ The existing conditions counts used in the LTA and in this analysis represent counts taken before the COVID-19 pandemic and subsequently adjusted. However, for the calibration, field conditions observed on a typical weekday were calibrated to existing traffic volumes from counts collected on a typical weekday during the COVID-19 pandemic. See Attachment B for the traffic volumes used in calibration.

To build in flexibility for pedestrian accommodation, the modeled signal timing (pedestrian intervals) at Harder/Dollar also included an allowance for a 4-second leading pedestrian interval (LPI) for crossing all four intersection legs.

- Lane configuration. The Existing Plus Project models were updated to include the proposed signal at Harder/Dollar, with a dedicated left-turn lane and a shared right/through lane on the northbound approach (as illustrated in Figure 2 below). The northbound left-turn lane was modeled to be approximately 95 feet in length. The northbound link was modeled as 500 feet to capture queues that may extend beyond a formal approach on the project site; in reality, the project site plan includes approximately 140 feet for formal queueing at the signal approach. The left-turn and through/right lanes would each be 11 feet wide, and the southbound receiving lane would be 13 feet, 9 inches wide. The sidewalks on either side as proposed in the project site plan would be retained as presented in the project site plan (see the LTA).
- No other lane configurations were altered.
- Adjacent intersections: The simulation network was modeled to include the approach roadways extending to the nearest signalized intersections. The simulated vehicles are generated at those locations. In all cases, the signals are sufficiently far such that any vehicle platoons would be relatively dispersed upon arrival. The signal at Harder Road / Jane Avenue was included in the simulation to generate vehicles approaching the primary study intersections. The simulation did not include site access driveways along Mission Boulevard, given that the focus of the analysis was Harder/Dollar.

For all simulations, 10 runs of each peak 1 hour were conducted, and the results were averaged.

Figure 2: Existing Plus Project Mission/Harder Intersection Model



Source: Kittelson & Associates, Inc.

MULTIMODAL VOLUMES

The details of multimodal traffic volume collection and adjustments related to the COVID-19 pandemic are included in the LTA. The analysis volumes used for this simulation analysis are presented in Figure 3, Figure 4, Table 1, and Table 2. Existing counts did not include any pedestrian crossings of Harder Road at Dollar Street, in part because there is no marked crossing or control to cross at the intersection. With the proposed project in place and a signalized crossing present, some level of pedestrian activity would be expected. Therefore, pedestrian volumes were adjusted to six crossings in each peak hour at the east and west legs in the signalized scenario as indicated in Tables 1 and 2.

Figure 3: Existing Conditions Vehicle Volumes

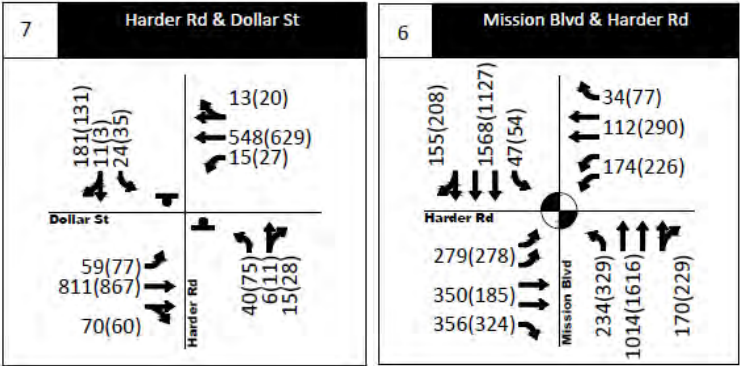


Figure 4: Existing Plus Project Conditions Vehicle Volumes

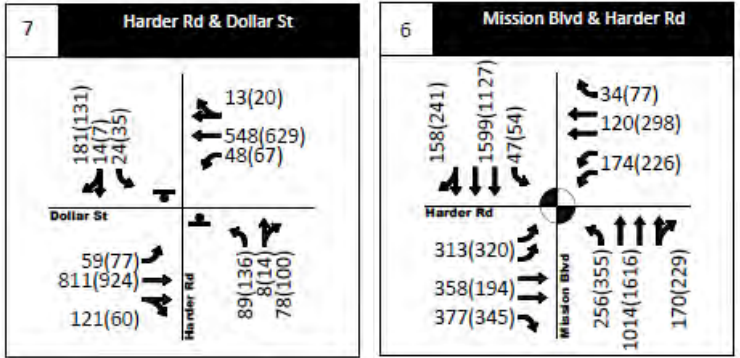


Table 1: Pedestrian and Bicycle Volumes (Weekday AM Peak Hour)

#	Intersection	Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0
2	Mission Boulevard & Berry Avenue	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0
3	Mission Boulevard & Torrano Avenue N	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
4	Mission Boulevard & Torrano Avenue S	22	2	10	14	0	1	0	0	0	0	0	0	0	0	1	0
5	Mission Boulevard & Tennyson Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mission Boulevard & Harder Road	0	1	0	0	1	0	0	1	0	1	1	1	0	1	0	0
7	Harder Road & Dollar Street	0	0	0, 6*	0, 6*	0	1	0	0	0	0	0	0	0	0	0	0
8	Harder Road & Jane Avenue	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9	Harder Road & Soto Road	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Data Source: Quality Counts and Metro Traffic Data historic manual turning movement counts (June 2016, September 2016, April 2019)

*Adjusted upward from zero observed counts in the signal alternatives to account for anticipated future crossing demand.

Table 2: Pedestrian and Bicycle Volumes (Weekday PM Peak Hour)

#	Intersection	Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Carlos Bee Boulevard / Orchard Avenue	3	5	9	10	0	1	0	0	1	0	0	0	0	0	0	0
2	Mission Boulevard & Berry Avenue	2	0	2	3	0	0	0	0	2	0	0	0	0	0	1	0
3	Mission Boulevard & Torrano Avenue N	4	0	0	8	0	0	0	0	4	0	0	8	0	0	0	0
4	Mission Boulevard & Torrano Avenue S	4	0	0	8	0	1	0	0	11	0	0	7	0	0	5	0
5	Mission Boulevard & Tennyson Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mission Boulevard & Harder Road	0	9	16	0	0	1	0	0	0	0	0	0	0	0	1	0
7	Harder Road & Dollar Street	4	9	0, 6*	0, 6*	1	0	0	0	0	0	1	1	0	0	0	0
8	Harder Road & Jane Avenue	0	7	1	5	0	0	0	0	0	1	0	0	0	0	1	0
9	Harder Road & Soto Road	21	0	4	0	0	0	0	0	0	0	1	2	0	0	0	0

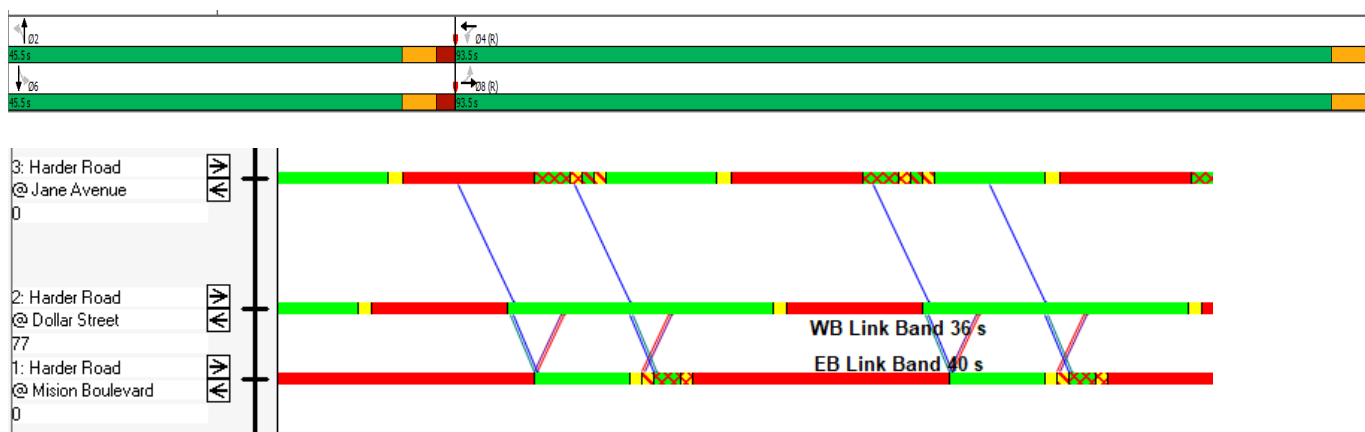
Data Source: Quality Counts and Metro Traffic Data historic manual turning movement counts (June 2016, September 2016, April 2019)

*Adjusted upward from zero observed counts in the signal alternatives to account for anticipated future crossing demand.

COORDINATION AND TIMING PLANS

Several coordination plans were preliminarily tested to optimize the signal phase sequences between the Harder/Dollar and Mission/Harder intersections. The phase sequencing shown below was selected to minimize the potential for the queuing-related concerns discussed in the *Background and Key Issues* section.

Figure 5: Signal Phasing



FEASIBILITY EVALUATION MEASURES

This section discusses measures used to evaluate the intersection's feasibility:

- Level of service and delay: The vehicle travel delay and LOS for each scenario and peak hour for each was assessed to evaluate the intersections against City LOS standards.
- Queue lengths: The average and 95th percentile queue lengths for each scenario and peak hour were assessed to evaluate the potential for the spill-over effects previously discussed.

Because this analysis is concerned with the Existing Plus Project Conditions (i.e., conditions with the project in place), existing conditions results are not presented in the body of this memorandum. They are included in Attachment A.

Other design tradeoffs not directly measured include pedestrian access, bicyclist safety and comfort, and truck access. They are discussed in the subsequent section, after the discussion of the other performance measures.

FEASIBILITY EVALUATION

LEVEL OF SERVICE AND DELAY

As previously discussed, the simulation was initially calibrated with stop control and existing volumes at Harder/Dollar and then updated to include a signal at the intersection for comparison. The LOS and delay results for Existing Plus Project Conditions both with existing traffic control and with a signal at Harder/Dollar are presented in Table 3. Only the movements most pertinent to the potential effects or with notable changes in average delay are presented; full results are included in Attachment B.

Table 3: Average Control Delay, Existing Plus Project at Harder/Dollar, With and Without Signal

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		Stop Control at Harder/Dollar	Traffic Signal at Harder/Dollar	Stop Control at Harder/Dollar	Traffic Signal at Harder/Dollar
Harder / Dollar	WBL	15.3	21.1	13	17.5
	WBT	1.8	3.2	2	4.6
	WBR	0.4	1.8	1.9	3.6
	NBL	168.1	47.1	95.3	45.2
	NBT	54.4	38.9	60.5	37.6
	NBR	42.8	14.6	33.5	12.4
	SBL	25.6	44.8	59.7	45.3
	SBT	56.7	42.6	56	42.8
	SBR	31.1	12.8	16.6	11.2
	Worst Movement (Movement, LOS) ¹	168.1 (NBL, F)	47.1 (NBL)	95.3 (NBL, F)	45.3 (SBL)
	Average Intersection Delay (LOS) ²	-	11.9 (B)	-	11 (B)
Mission / Harder	EBL	57.6	54.2	61.2	56
	EBT	51	44.9	58.8	54.4
	EBR	21.3	18.8	12.4	12.2
	Average Intersection Delay (LOS) ¹	46.7 (D)	50.1 (D)	41.3 (D)	40.0 (D)

Source: Kittelson & Associates, Inc. 2021

1: LOS per movement only presented for stop-controlled intersections.

2: Overall LOS is typically not reported for stop-control intersections because the worst movement's delay is the relevant measure.

Findings

The operational results include the following findings relevant to the LTA and to overall signal feasibility:

- With signalization, the Harder/Dollar intersection operates at LOS B, within the City's LOS standard. Northbound and southbound drivers have significantly reduced average delay. In the stop-control scenario, the northbound left movement was the worst movement from an average delay standpoint. Delay for that movement is reduced from 168.1 to 47.1 seconds in the AM peak hour and from 95.3 seconds to 45.3 seconds in the PM peak hour. Similar but more modest reductions are realized for southbound drivers.
- At Harder/Dollar, westbound left turning movements incur slightly more average delay with the signal compared to with stop control.
- Delay at Mission/Harder is marginally affected, with similar or slightly lower average delay on the eastbound approach which backs up to Harder/Dollar.

QUEUE LENGTHS

Queue lengths relate most directly to the potential effects of signalization, especially any spillback between the two studied intersections. The average and 95th percentile queue lengths at Harder/Dollar and Mission/Harder are presented in Table 4 and Table 5. Only the movements most pertinent to the potential effects or with notable changes in average delay are presented; full results are included in Attachment .

Table 4: Queue Lengths, Existing Plus Project Conditions, AM Peak Hour

Intersection	Movement	Storage (ft)	Stop Control at Harder/Dollar		Signal at Harder/Dollar		Change in Queue Lengths with Signal at Harder/Dollar	
			Average Queue length (ft)	95th Percentile Queue Length (ft)	Average Queue length (ft)	95th Percentile Queue Length (ft)	Average Queue length (ft)	95th Percentile Queue Length (ft)
Harder / Dollar	NBL	95	83	139	69	116	(14)	(23)
	NBT/R	140	146	369	51	125	(95)	(244)
	SBL	65	17	43	18	53	1	10
	SBT/R	190	105	220	74	157	(31)	(63)
	WBL	100	34	71	38	76	4	5
	WBT/R	280	6	33	25	70	19	37
	EBL	190	10	30	26	86	16	56
	EBT/R	730	10	26	98	273	88	247
Mission / Harder	NBL	550	235	343	207	331	(28)	(12)
	NBT/R	1040	209	344	225	352	16	8
	SBL	250	60	223	74	308	14	85
	SBT/R	1350	413	563	479	784	66	221
	WBL	240	72	124	75	127	3	3
	WBT/R	415	27	55	31	60	4	5
	EBL	120	149	195	136	199	(13)	4
	EBT/R	280	158	292	148	279	(10)	(13)

Source: Kittelson & Associates, Inc. 2021

Note: Red numbers indicate queue lengths extending past available storage.

Table 5: Queue Lengths, Existing Plus Project Conditions, PM Peak Hour

Intersection	Movement	Storage	Stop Control at Harder/Dollar		Signal at Harder/Dollar		Change in Queue Lengths with Signal at Harder/Dollar	
			Average Queue length (ft)	95th Percentile Queue Length (ft)	Average Queue length (ft)	95th Percentile Queue Length (ft)	Average Queue length (ft)	95th Percentile Queue Length (ft)
Harder / Dollar	NBL	95	75	130	65	117	(10)	(13)
	NBT/R	140	104	297	59	136	(45)	(161)
	SBL	65	32	75	24	61	(8)	(14)
	SBT/R	190	57	104	50	92	(7)	(12)
	WBL	100	36	82	43	85	7	3
	WBT/R	280	7	48	54	138	47	90
	EBL	190	9	57	32	78	23	21
	EBT/R	730	5	26	86	200	81	174
Mission / Harder	NBL	550	270	428	255	388	(15)	(40)
	NBT/R	1040	304	458	307	459	3	1
	SBL	250	46	95	45	96	(1)	1
	SBT/R	1350	298	152	319	425	21	273
	WBL	240	96	157	93	151	(3)	(6)
	WBT/R	415	102	175	100	172	(2)	(3)
	EBL	120	132	192	131	189	(1)	(3)
	EBT/R	280	108	245	96	233	(12)	(12)

Source: Kittelson & Associates, Inc. 2021

Note: Red numbers indicate queue lengths extending past available storage.

Findings

The results indicate the following related to the potential effects of signalization:

- Westbound queues at Harder/Dollar would not spill back to Mission/Harder with signalization at Harder/Dollar. Westbound queues at Harder/Dollar were virtually nonexistent with the existing stop control at Harder/Dollar. With the signal installed, they increase in the AM and PM peak periods. However, in both peak periods the left-turn and through movement 95th percentile queues are served by available storage. The longest westbound queue is the 95th percentile through movement in the PM peak period; the 138-foot-long queue represents about half of available storage.
- Eastbound queues at Mission/Harder spill back to Harder/Dollar without signalization at Harder/Dollar and may continue to do so with signalization. The eastbound approach at Mission/Harder experiences relatively long queues due to the long cycle length used by the adaptive system on Mission Boulevard. In the existing stop control configuration, eastbound through/right turn 95th percentile queues spill back to the Harder/Dollar intersection in the AM peak period. The queue reduces slightly in the signalized scenario, but the 95th percentile queue is shown essentially to occupy the full storage length. Because of the proposed signal phasing and the relatively low Dollar Street volumes, these queues did not obstruct other movements (e.g., southbound left turns or eastbound through movements at Harder/Dollar) from being served and clearing the intersection. To avoid queue spillback from resulting in the Harder/Dollar intersection being blocked, it is recommended to install KEEP CLEAR pavement markings within the intersection.
- Northbound and southbound queuing at Harder/Dollar is reduced with signalization at Harder/Dollar. In the AM and PM peak hours, northbound left-turn and through/right queuing is reduced from extending beyond available storage to being served within it. In the PM peak hour, northbound through/right 95th percentile queuing occupies almost the full available storage; any additional queuing would occur within the project site. Table 6 and Table 7 reorganize information already presented to show the comparative average and 95th percentile queue lengths for the site access in Existing and Existing Plus Project conditions.

Table 6: Harder/Dollar Queues, AM Peak Hour

Movement	Storage (ft)	Measure	Queue Lengths by Scenario (ft)		
			Stop Control		Signal
			Existing Conditions	Existing + Project	Existing + Project
NBL	95	Average	33	83	69
		95th Percentile	68	139	116
NBT/R	140	Average	16	146	51
		95th Percentile	51	369	125

Source: Kittelson & Associates, Inc. 2021

Note: Red numbers indicate queue lengths extending past available storage.

Table 7: Harder/Dollar Queues, PM Peak Hour

Movement	Storage (ft)	Measure	Queue Lengths by Scenario (ft)		
			Stop Control		Signal
			Existing Conditions	Existing + Project	Existing + Project
NBL	95	Average	55	75	65
		95th Percentile	110	130	117
NBT/R	140	Average	27	104	59
		95th Percentile	59	297	136

Source: Kittelson & Associates, Inc. 2021

Note: **Red numbers** indicate queue lengths extending past available storage.

Overall, the potential queuing spillover effects contemplated in the introduction to this memo do not impact the feasibility of a signal at Harder/Dollar. Because queue spillback from Mission/Harder to Harder/Dollar is possible, it is recommended to install KEEP CLEAR pavement markings in the intersection.

OTHER CONSIDERATIONS

Pedestrian Access

As noted previously, a traffic signal at Harder/Dollar may benefit pedestrians with respect to safety and access as well. In particular, the following benefits were modeled and are recommended:

- The signal was modeled to include pedestrian crossings at all four intersection legs and retains the proposed sidewalks on both sides of the project access on the south leg of Dollar Street. The pedestrian crossings would be push-button actuated. It is recommended to install high-visibility continental or ladder-style crosswalks and provide pedestrian phases across all four legs of the intersection. The signals should include pushbutton actuation for pedestrians and accessible pedestrian signals (APS).
- The signal was also modeled with an allowance in the pedestrian intervals to include a 4-second leading pedestrian interval (LPI) on all crossings. It is recommended to include an LPI in the signal timing, which would give pedestrians a head start crossing the intersection.
- The presence of a signal provides for pedestrians an additional crossing of Harder Road, which was identified in the Hayward Bicycle and Pedestrian Master Plan (BPMP) as part of the City's pedestrian high-injury network. The signalized crossing would reduce route circuitry in accessing the project site from the north.

Bicyclist Safety and Comfort

Harder Road includes an on-street bicycle lane (Class II) in both directions. The installation of a signal would not change that but would provide the following opportunities and benefits to people biking:

- Provision for left turns. For people biking to make an eastbound or westbound left-turn under the existing configuration, they need to weave across two lanes of traffic either uphill traveling east or within 200 feet of the Mission/Harder intersection traveling west. To improve accessibility and provide left-turns for bicyclists, the traffic signal is recommended to include two-stage turn boxes for both eastbound and westbound left turns. Pages 25-26 of Appendix D of the BPMP include details and guidance for designing and installing the treatment. See Figure 6 for an example and Item A in Figure 7.
- Separation of eastbound through bicyclists at Harder/Dollar and drivers turning right at Dollar Street or at Harder Road. Traveling eastbound uphill, people biking currently face a possible “right-hook” conflict from drivers turning right onto Dollar Street/project driveway. Similarly, drivers turning right onto Mission Boulevard at the next intersection are required to merge across the bike lane. An advanced stop bar (“bike box”) is recommended on the eastbound approach for bicyclists to position themselves in front of (and to the left of) drivers turning right at Dollar Street or Harder Road. The bike box would improve comfort and safety for people biking. Details and design guidance are provided on pages 23-24 of Appendix D to the BPMP. Green “crossbike” markings continuing the bicycle lane through the intersection would clearly delineate space for people biking through the intersection along Harder Road eastbound and westbound. Pages 27-28 of Appendix D to the BPMP include details and design guidance. See Figure 6 for an example and Item B in Figure 7.

Figure 6: Two-stage turn box (left) and bike box (right). Both treatments could provide dedicated space for bicyclists along Harder Road at Harder/Dollar.



Source: NACTO

Truck Access

The LTA discussed truck access to and from the site and notes that large trucks (i.e. AASHTO WB-67 trucks and others longer than 30- or 40-foot-long single unit trucks) can access the site but would over track into opposing lanes both entering and exiting the site. Based on this potential conflict (which is unrelated to the intersection control at Harder/Dollar), the LTA recommends that tenants schedule large truck deliveries to the project site to occur outside of the AM and PM peak hours (7:00-9:00 AM and 4:00-6:00 PM, respectively).

This LTA recommendation has an ancillary benefit related to signal operations. Large trucks would occupy all or almost all of the westbound left-turn storage at Harder/Dollar. Any potential effect on queueing of truck access would be attenuated by recommending their site access to outside the peak hours.

When designing the pavement markings for the intersection, consider pulling back/staggered the left-turn stop bar to allow for truck over tracking.

LIMITATIONS

This analysis documented on this memorandum focused on Existing Plus Project conditions as the pertinent scenario for this analysis. It did not include any future-year (i.e., Cumulative) conditions which have less certain assumptions associated with their development and are appropriate for less detailed analysis. future-year forecast information associated with them and which represent a more distant planning horizon with uncertain information . The discussion and presentation of results considered the operations of the two closely spaced signals (Harder/Dollar and Harder/Mission) with respect to queueing and assumed a fixed cycle length at Mission/Harder. Any queueing between the Harder/Dollar and Harder/Jane intersections is not considered to be impacted by the new signal.

RECOMMENDATIONS

This analysis demonstrated that installation of a traffic signal at Harder/Dollar, as recommended in the LTA, is feasible from an operational standpoint. The following recommendations are proposed to accompany the future signal.

- Include the Harder/Dollar intersection as a secondary intersection to Mission/Harder on the SCATS coordinated signal system. The simulation analysis was predicated on the assumption that the signals could operate on a system together and adapt together (i.e., signal cycles expand and shorten in tandem). This will help to minimize potential for queue spillback between the two intersections.
- Provide a dedicated left-turn lane and a shared right/through lane on the northbound approach at Harder/Dollar. The project proposed site plan can accommodate a 11-foot-wide left-turn lane, an 11-foot-wide through/right turn lane, and a 13-foot, 9-inch-wide southbound receiving lane. Provide sufficient striped storage length to accommodate at least the average northbound left-turn queue in the PM peak period (65 feet) and, if possible, the 95th percentile queue in the PM peak period (117 feet).
- Install KEEP CLEAR pavement markings in the Harder/Dollar intersection.
- Install high-visibility continental or ladder-style crosswalks and provide pedestrian phases across all four legs of the Harder/Dollar intersection. The signals should include pushbutton actuation for pedestrians and APS.

- It is recommended to include a four-second LPI in the signal timing for all four pedestrian phases, which would give pedestrians a head start crossing the intersection.
- To improve accessibility and provide left-turns for bicyclists, stripe two-stage turn boxes for both eastbound and westbound left turns. Pages 25-26 of Appendix D of the BPMP include details and guidance for designing and installing the treatment. See Item A in Figure 7.
- Install an advanced stop bar ("bike box") on the eastbound approach to Harder/Dollar for bicyclists to position themselves in front of (and to the left of) drivers turning right at Dollar Street or Harder Road. The bike box would improve comfort and safety for people biking. Details and design guidance are provided on pages 23-24 of Appendix D to the BPMP. See item B in Figure 7.
- Provide green skip-striping to continue the bicycle lane and clearly delineate space for people biking through the intersection along Harder Road eastbound and westbound. Pages 27-28 of Appendix D to the BPMP include details and design guidance.
- When designing the pavement markings for the intersection, consider pulling back/staggered the left-turn stop bar to allow for truck over tracking. See Item C in Figure 7.

Figure 7: Recommendations for Harder/Dollar Signal



Source: Google

ATTACHMENT A
EXISTING CONDITIONS
OPERATIONS RESULTS WORKSHEETS

SimTraffic Simulation Summary

Existing

AM
03/10/2021

Summary of All Intervals

Start Time	6:55
End Time	8:00
Total Time (min)	65
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	5502
Vehs Exited	5501
Starting Vehs	200
Ending Vehs	201
Travel Distance (mi)	4261
Travel Time (hr)	219.3
Total Delay (hr)	83.8
Total Stops	5689
Fuel Used (gal)	158.9

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	5502
Vehs Exited	5501
Starting Vehs	200
Ending Vehs	201
Travel Distance (mi)	4261
Travel Time (hr)	219.3
Total Delay (hr)	83.8
Total Stops	5689
Fuel Used (gal)	158.9

SimTraffic Performance Report Existing

AM
03/10/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	1.8	0.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	55.8	51.0	18.5	50.2	55.2	4.2	54.5	32.2	22.9	61.4	58.4	47.8

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	45.9

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	7.0	2.0	1.3	11.0	1.4	1.4	40.1	39.4	19.0	26.8	26.9	10.3

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	4.4

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.8	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.3
Total Del/Veh (s)	48.2	10.0	0.8	54.6	17.1	3.4	24.8	34.1	8.3	44.4	34.2	9.1

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	18.2

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.1
Total Del/Veh (s)	0.9	10.4	3.6	6.6

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	52.6

Queuing and Blocking Report

Existing

AM
03/10/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	175	307	209	246	106	120	65	82	33	309	425
Average Queue (ft)	107	136	124	113	100	44	73	28	24	5	155	234
95th Queue (ft)	157	192	221	178	180	97	119	59	59	21	241	361
Link Distance (ft)			297	297				2077	2077			629
Upstream Blk Time (%)			0									
Queuing Penalty (veh)			1									
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	5	23	14									
Queuing Penalty (veh)	9	40	40									

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	414	394	573	630	648	619
Average Queue (ft)	217	191	53	419	439	397
95th Queue (ft)	338	323	219	590	615	577
Link Distance (ft)	629	629		1400	1400	1400
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			500			
Storage Blk Time (%)				4		
Queuing Penalty (veh)				2		

Intersection: 2: Dollar Street & Harder Road

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	41	70	28	27	71	74	48	175
Average Queue (ft)	10	9	1	1	33	16	16	65
95th Queue (ft)	30	37	9	9	68	51	40	125
Link Distance (ft)			297	297	314	314	1478	1478
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	110	80						
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Queuing and Blocking Report

Existing

AM
03/10/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	264	324	205	5	124	196	231	102	114	79	187	145
Average Queue (ft)	132	93	90	0	20	99	110	20	43	30	123	71
95th Queue (ft)	208	204	178	2	76	183	202	52	91	61	180	119
Link Distance (ft)		1676	1676	1676		714	714	714	706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100							
Storage Blk Time (%)	1	0			0	7						
Queuing Penalty (veh)	3	1			0	1						

Intersection: 4: Mision Boulevard & South Driveway

Movement	SB	SB
Directions Served	T	T
Maximum Queue (ft)	629	688
Average Queue (ft)	98	81
95th Queue (ft)	429	390
Link Distance (ft)	629	629
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 99

SimTraffic Simulation Summary

Existing

PM
03/10/2021

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:55	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	5965	5969	5985	5934	5959	6040	5984
Vehs Exited	5984	5992	5985	5975	5988	5969	5950
Starting Vehs	239	224	225	256	216	175	198
Ending Vehs	220	201	225	215	187	246	232
Travel Distance (mi)	4632	4639	4651	4600	4617	4670	4619
Travel Time (hr)	231.8	233.0	239.2	229.4	227.9	235.2	229.6
Total Delay (hr)	83.2	84.1	89.8	81.8	79.7	85.4	81.3
Total Stops	5529	5518	5749	5539	5260	5622	5398
Fuel Used (gal)	168.3	168.8	171.2	166.3	166.8	169.8	167.6

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6052	5982	5995	5984
Vehs Exited	6051	5954	6002	5986
Starting Vehs	223	201	205	215
Ending Vehs	224	229	198	215
Travel Distance (mi)	4712	4634	4637	4641
Travel Time (hr)	237.9	231.8	234.4	233.0
Total Delay (hr)	87.1	83.1	85.5	84.1
Total Stops	5701	5596	5693	5563
Fuel Used (gal)	172.3	168.3	169.3	168.9

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

SimTraffic Simulation Summary

Existing

PM
03/10/2021

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	5965	5969	5985	5934	5959	6040	5984
Vehs Exited	5984	5992	5985	5975	5988	5969	5950
Starting Vehs	239	224	225	256	216	175	198
Ending Vehs	220	201	225	215	187	246	232
Travel Distance (mi)	4632	4639	4651	4600	4617	4670	4619
Travel Time (hr)	231.8	233.0	239.2	229.4	227.9	235.2	229.6
Total Delay (hr)	83.2	84.1	89.8	81.8	79.7	85.4	81.3
Total Stops	5529	5518	5749	5539	5260	5622	5398
Fuel Used (gal)	168.3	168.8	171.2	166.3	166.8	169.8	167.6

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	6052	5982	5995	5984
Vehs Exited	6051	5954	6002	5986
Starting Vehs	223	201	205	215
Ending Vehs	224	229	198	215
Travel Distance (mi)	4712	4634	4637	4641
Travel Time (hr)	237.9	231.8	234.4	233.0
Total Delay (hr)	87.1	83.1	85.5	84.1
Total Stops	5701	5596	5693	5563
Fuel Used (gal)	172.3	168.3	169.3	168.9

SimTraffic Performance Report

Existing

PM
03/10/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	1.7	0.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	60.4	57.6	12.4	59.5	58.1	10.3	55.4	27.3	23.9	71.1	45.4	30.5

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	38.9

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.1
Total Del/Veh (s)	11.8	2.1	1.6	7.9	1.7	1.4	45.5	44.8	11.3	45.8	49.9	10.1

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	5.8

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.0	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	47.8	12.0	1.3	55.8	22.7	4.7	36.0	35.2	7.3	39.5	41.7	10.8

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	22.3

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	1.1	7.4	3.8

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	48.4

Queuing and Blocking Report

Existing

PM
03/10/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	174	270	202	205	151	176	192	191	77	433	500
Average Queue (ft)	101	122	79	72	78	70	93	95	96	9	236	286
95th Queue (ft)	157	184	193	140	158	131	155	161	164	43	371	432
Link Distance (ft)			297	297				2080	2080			612
Upstream Blk Time (%)			0	0								0
Queuing Penalty (veh)			1	0								0
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	10	23	2	0			0	0	3			0
Queuing Penalty (veh)	9	21	7	0			0	0	2			1

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	502	478	117	436	459	427
Average Queue (ft)	287	280	47	285	309	273
95th Queue (ft)	432	420	97	406	430	400
Link Distance (ft)	612	612		1400	1400	1400
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			500			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 2: Dollar Street & Harder Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	78	15	13	49	12	35	144	76	80	100
Average Queue (ft)	23	1	1	12	1	2	55	27	26	47
95th Queue (ft)	55	11	8	40	11	17	110	59	65	85
Link Distance (ft)		714	714		297	297	314	314	1478	1478
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			80						
Storage Blk Time (%)	0			0	0					
Queuing Penalty (veh)	0			0	0					

Queuing and Blocking Report

Existing

PM
03/10/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	264	489	322	15	124	303	315	96	78	56	192	148
Average Queue (ft)	201	138	89	2	61	142	155	35	29	18	95	66
95th Queue (ft)	292	353	204	9	127	263	273	73	66	46	167	120
Link Distance (ft)		1676	1676	1676		714	714	714	706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100							
Storage Blk Time (%)	9	0			2	14						
Queuing Penalty (veh)	33	0			6	9						

Intersection: 4: Mision Boulevard & South Driveway

Movement	NB	NB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	12	7	321	442
Average Queue (ft)	0	0	11	18
95th Queue (ft)	12	7	135	180
Link Distance (ft)	1010	1010	612	612
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 8: Bend

Movement	NB	NB	B11
Directions Served	T	T	T
Maximum Queue (ft)	4	5	4
Average Queue (ft)	0	0	0
95th Queue (ft)	4	5	3
Link Distance (ft)	89	89	1400
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report Existing

PM
03/10/2021

Intersection: 11: Bend

Movement	NB
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	1400
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 89

ATTACHMENT B

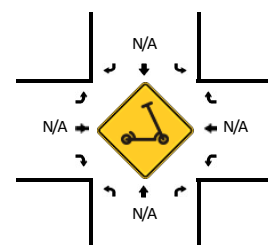
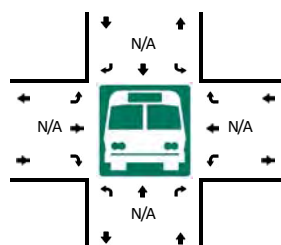
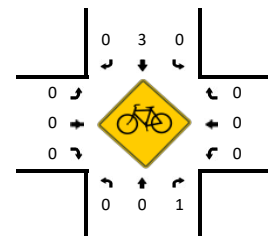
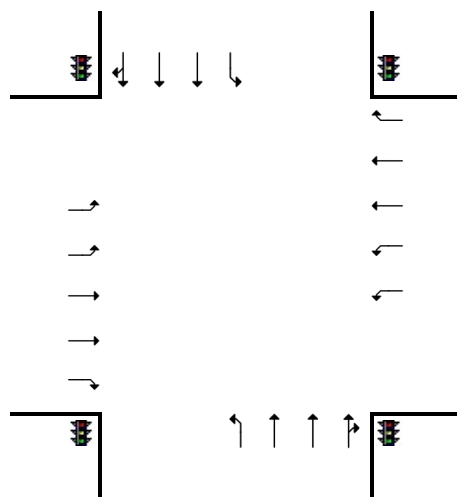
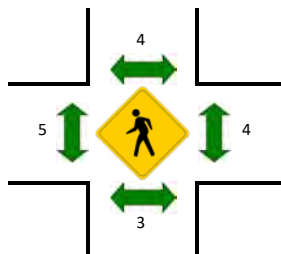
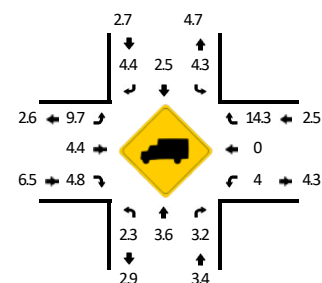
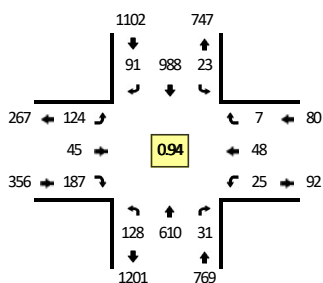
CALIBRATION VOLUMES AND OPERATIONS
RESULTS

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Harder Rd**CITY/STATE:** Hayward, CA**QC JOB #:** 15323701**DATE:** Thu, Nov 19 2020

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



5-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	8	35	4	0	0	74	11	0	13	1	9	0	4	1	1	0	161	
7:05 AM	8	45	1	0	0	77	4	1	4	1	7	0	2	3	1	0	154	
7:10 AM	5	29	1	0	1	62	5	0	12	2	9	0	2	4	0	0	132	
7:15 AM	17	48	2	0	0	76	8	0	4	3	18	0	3	1	1	0	181	
7:20 AM	4	64	0	0	3	78	7	1	13	0	12	0	4	0	0	0	186	
7:25 AM	7	47	1	0	1	67	5	1	13	3	18	1	3	9	1	0	177	
7:30 AM	6	46	2	0	2	97	7	1	11	1	20	0	1	1	1	0	196	
7:35 AM	6	41	2	0	1	87	6	0	13	1	20	0	1	6	0	0	184	
7:40 AM	6	46	4	0	0	87	9	0	7	2	10	0	5	6	0	0	182	
7:45 AM	12	53	3	0	2	90	11	0	12	3	14	0	3	5	1	0	209	
7:50 AM	7	58	2	0	1	103	5	0	14	9	13	0	2	2	0	0	216	
7:55 AM	15	58	1	0	2	69	4	1	12	3	15	0	2	2	2	0	186	2164
8:00 AM	7	58	4	0	1	66	6	0	5	4	18	0	3	4	0	0	176	2179
8:05 AM	15	48	1	0	1	75	7	2	10	1	15	0	2	10	1	0	188	2213
8:10 AM	15	45	4	0	1	89	13	0	10	7	13	0	1	2	0	0	200	2281
8:15 AM	10	53	1	0	0	77	6	0	10	7	18	1	2	4	0	0	189	2289
8:20 AM	15	48	5	1	1	66	10	2	8	3	19	0	1	2	1	0	182	2285
8:25 AM	13	56	2	0	4	82	7	1	11	4	12	0	2	4	1	0	199	2307
8:30 AM	10	35	4	0	0	47	8	0	7	3	13	0	4	7	3	0	141	2252
8:35 AM	6	34	6	0	3	82	13	1	9	3	12	0	2	6	2	0	179	2247
8:40 AM	11	67	4	0	0	75	7	0	18	6	14	0	2	3	1	0	208	2273
8:45 AM	14	68	5	0	1	66	12	0	9	3	11	0	2	5	0	0	196	2260
8:50 AM	15	34	2	0	0	65	5	2	12	7	14	0	5	7	2	0	170	2214
8:55 AM	11	43	3	0	6	83	6	0	13	3	13	0	2	3	1	0	187	2215
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	136	676	24	0	20	1048	80	4	152	60	168	0	28	36	12	0	2444	
Heavy Trucks	0	24	0	0	0	16	4	0	12	4	8	0	4	0	0	0	72	
Buses																		
Pedestrians		8				0				4				4			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

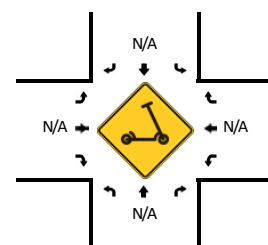
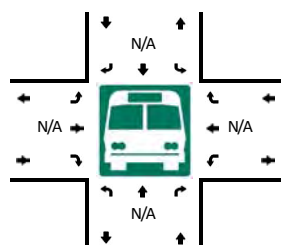
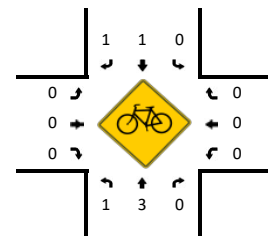
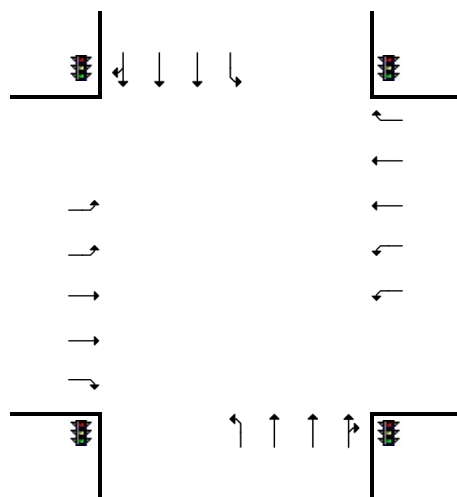
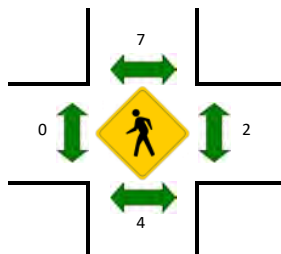
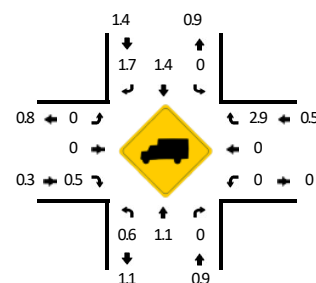
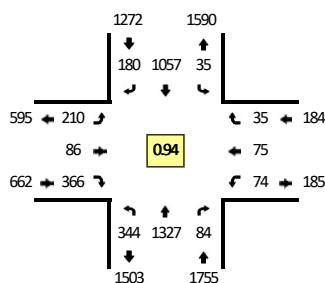
Comments:

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Harder Rd**CITY/STATE:** Hayward, CA**QC JOB #:** 15323702**DATE:** Thu, Nov 19 2020

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM



5-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	18	98	10	0	0	54	8	4	14	7	33	0	11	7	3	0	267	
4:05 PM	23	102	8	0	0	43	10	2	8	9	42	1	8	8	4	0	268	
4:10 PM	30	97	7	0	1	47	6	0	20	14	40	0	7	9	3	0	281	
4:15 PM	27	109	17	0	1	60	9	4	17	7	38	0	4	10	2	0	305	
4:20 PM	30	93	10	0	0	65	10	2	20	7	39	1	10	5	1	0	293	
4:25 PM	27	94	9	1	2	59	16	0	19	5	39	0	1	6	6	0	284	
4:30 PM	25	102	8	0	1	66	5	0	23	11	24	1	14	11	4	1	296	
4:35 PM	20	130	6	1	1	28	6	4	13	13	30	1	2	4	4	0	263	
4:40 PM	19	134	9	0	0	39	14	1	19	4	39	0	9	5	0	0	292	
4:45 PM	20	114	7	0	0	85	15	2	18	10	46	0	5	6	1	0	329	
4:50 PM	39	109	8	0	2	95	8	1	18	6	31	0	5	7	5	0	334	
4:55 PM	26	92	4	0	2	104	20	2	16	7	40	1	8	3	3	0	328	3540
5:00 PM	21	120	12	2	1	106	26	2	20	9	24	0	6	13	7	0	369	3642
5:05 PM	39	111	8	0	1	75	20	0	7	7	21	1	11	10	2	0	313	3687
5:10 PM	23	95	8	0	1	89	18	4	19	7	31	0	10	11	4	0	320	3726
5:15 PM	25	106	8	1	0	68	12	0	15	8	33	0	5	3	6	0	290	3711
5:20 PM	28	115	3	0	2	99	12	0	29	8	33	0	3	5	3	0	340	3758
5:25 PM	36	126	9	1	5	69	18	3	23	5	25	0	8	4	0	0	332	3806
5:30 PM	20	121	6	0	0	78	7	1	11	10	37	0	6	4	0	0	301	3811
5:35 PM	26	88	2	1	0	101	9	1	17	3	23	0	4	5	1	0	281	3829
5:40 PM	35	130	9	1	1	88	15	4	15	6	22	0	3	4	3	0	336	3873
5:45 PM	24	119	5	0	1	81	14	3	17	4	27	0	3	4	2	0	304	3848
5:50 PM	24	106	5	1	1	85	11	3	10	7	20	1	4	5	1	0	284	3798
5:55 PM	30	108	5	0	1	89	10	2	22	6	22	0	2	5	2	0	304	3774
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	344	1284	96	8	20	1220	216	20	216	88	380	4	76	92	60	0	4124	
Heavy Trucks	4	20	0		0	20	4		0	0	4		0	0	0		52	
Buses																		
Pedestrians		0				12				0				4			16	
Bicycles	4	0	0		0	4	4		0	0	0		0	0	0		12	
Scooters																		

Comments:

Report generated on 12/3/2020 12:23 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

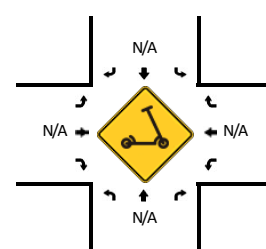
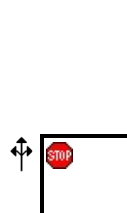
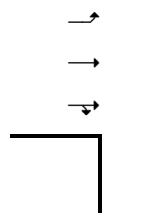
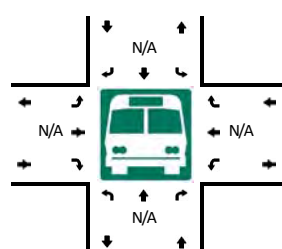
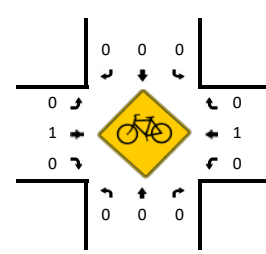
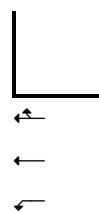
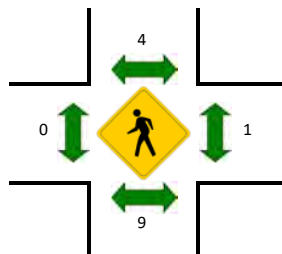
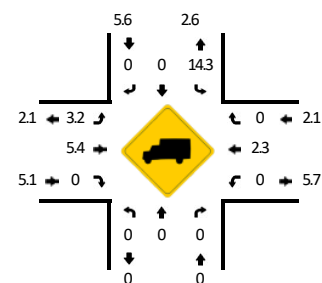
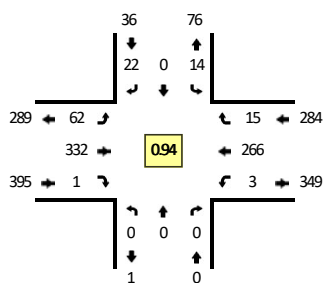
LOCATION: 2. Dollar St -- Harder Rd

CITY/STATE: Hayward, CA

QC JOB #: 15323703

DATE: Thu, Nov 19 2020

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



5-Min Count Period Beginning At	2. Dollar St (Northbound)				2. Dollar St (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	0	4	0	3	20	0	0	0	20	1	0	49	
7:05 AM	0	0	0	0	1	0	3	0	0	16	0	0	0	14	1	0	35	
7:10 AM	0	0	0	0	0	0	3	0	3	20	0	0	0	16	1	0	43	
7:15 AM	0	0	0	0	0	0	2	0	1	27	0	0	0	20	0	0	50	
7:20 AM	0	0	0	0	0	0	6	0	2	30	0	0	0	11	0	0	49	
7:25 AM	0	0	0	0	3	0	4	0	4	31	0	0	0	22	2	0	66	
7:30 AM	0	0	0	0	1	0	1	0	2	22	0	0	0	13	1	0	40	
7:35 AM	0	0	0	0	1	0	5	0	1	33	0	0	0	21	0	0	61	
7:40 AM	0	0	0	0	0	0	2	0	5	19	0	0	0	22	1	0	49	
7:45 AM	0	0	0	0	0	0	3	0	5	31	0	0	0	21	1	0	61	
7:50 AM	0	0	0	0	1	0	4	0	2	36	0	0	0	16	3	1	63	
7:55 AM	0	0	0	0	1	0	5	0	1	28	0	0	0	18	3	0	56	622
8:00 AM	0	0	0	0	1	0	2	0	5	24	0	0	0	12	0	0	44	617
8:05 AM	0	0	0	0	0	0	0	0	4	23	0	1	0	28	2	1	59	641
8:10 AM	0	0	0	0	1	0	0	0	1	28	0	0	0	32	1	1	64	662
8:15 AM	0	0	0	0	1	0	2	0	4	35	0	0	0	15	4	0	61	673
8:20 AM	0	0	0	0	3	0	0	0	6	27	0	0	0	22	2	1	61	685
8:25 AM	0	0	0	0	0	0	5	0	2	27	0	0	0	21	1	0	56	675
8:30 AM	0	0	0	0	0	0	2	0	9	19	0	0	0	25	1	0	56	691
8:35 AM	0	0	0	0	1	0	2	0	9	31	0	0	0	21	1	0	65	695
8:40 AM	0	0	0	0	3	0	2	0	4	29	0	0	0	20	0	0	58	704
8:45 AM	0	0	0	0	1	0	2	0	4	27	0	0	0	29	1	0	64	707
8:50 AM	0	0	0	0	2	0	2	0	2	31	0	0	0	22	2	0	61	705
8:55 AM	0	0	0	0	1	0	3	0	11	31	1	0	0	19	0	0	66	715
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	16	0	28	0	68	356	4	0	0	280	12	0	764	
Heavy Trucks	0	0	0	0	0	0	0	0	0	8	0	0	0	16	0	0	24	
Buses																		
Pedestrians		8				4				0				4			16	
Bicycles	0	0	0		0	0	0		0	4	0		0	4	0		8	
Scooters																		

Comments:

Report generated on 12/3/2020 12:23 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

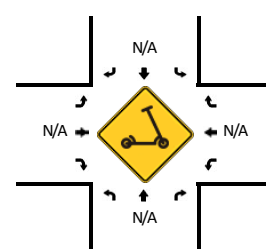
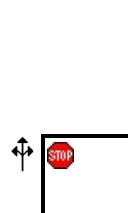
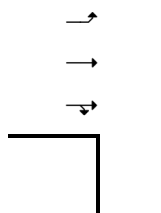
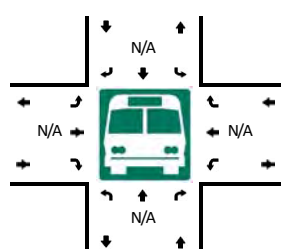
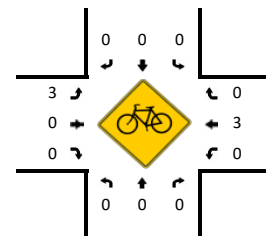
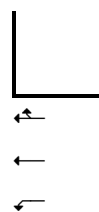
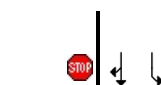
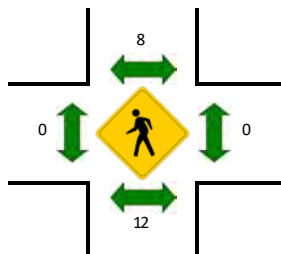
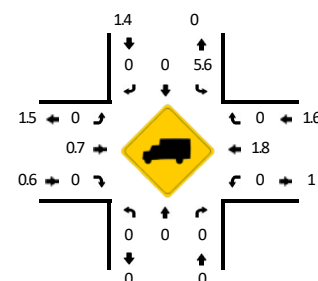
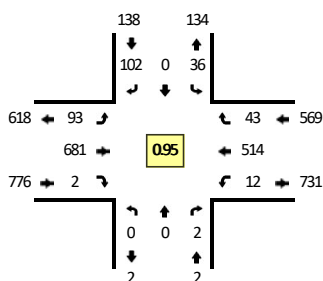
LOCATION: 2. Dollar St -- Harder Rd

CITY/STATE: Hayward, CA

QC JOB #: 15323704

DATE: Thu, Nov 19 2020

Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:55 PM -- 5:10 PM



5-Min Count Period Beginning At	2. Dollar St (Northbound)				2. Dollar St (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	4	0	7	0	4	60	0	0	0	36	4	0	115	
4:05 PM	0	0	0	0	1	0	9	0	4	48	0	0	0	38	3	0	103	
4:10 PM	0	0	1	0	2	0	9	0	6	75	1	0	0	36	5	1	136	
4:15 PM	0	0	0	0	5	0	8	0	11	66	0	0	0	42	3	2	137	
4:20 PM	0	0	0	0	2	0	3	0	4	61	0	0	0	38	2	1	111	
4:25 PM	0	0	1	0	3	0	6	0	11	53	1	0	0	44	3	1	123	
4:30 PM	0	0	0	0	2	0	12	0	4	56	0	1	0	38	1	1	115	
4:35 PM	0	0	0	0	4	0	6	0	4	51	0	0	0	27	3	3	98	
4:40 PM	0	0	0	0	2	0	6	0	13	64	0	1	0	36	5	2	129	
4:45 PM	0	0	0	0	3	0	5	0	10	61	0	0	0	40	3	0	122	
4:50 PM	0	0	0	0	1	0	8	0	7	59	0	0	0	44	6	0	125	
4:55 PM	0	0	0	0	5	0	11	0	9	55	0	0	0	44	4	1	129	1443
5:00 PM	0	0	0	0	5	0	12	0	7	40	0	0	0	58	5	0	127	1455
5:05 PM	0	0	0	0	2	0	16	0	5	40	0	0	0	67	3	0	133	1485
5:10 PM	0	0	0	0	4	0	9	0	8	48	0	0	0	51	2	2	124	1473
5:15 PM	0	0	0	0	2	0	9	0	4	63	0	0	0	37	3	0	118	1454
5:20 PM	0	0	0	0	4	0	12	0	6	63	0	0	0	44	3	1	133	1476
5:25 PM	0	0	0	0	2	0	9	0	7	57	0	0	0	54	3	0	132	1485
5:30 PM	0	0	0	0	1	0	15	0	3	47	0	0	0	31	2	2	101	1471
5:35 PM	0	0	0	0	2	0	12	0	2	34	0	1	0	42	0	0	93	1466
5:40 PM	0	0	0	0	2	0	5	0	7	46	0	0	0	53	2	0	115	1452
5:45 PM	0	0	0	0	5	0	7	0	4	39	0	0	0	38	3	2	98	1428
5:50 PM	0	0	0	0	0	0	2	0	1	42	0	0	0	48	4	0	97	1400
5:55 PM	0	0	0	0	5	0	7	0	3	40	0	0	0	46	1	1	103	1374
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	48	0	156	0	84	540	0	0	0	676	48	4	1556	
Heavy Trucks	0	0	0	0	4	0	0	0	0	0	0	0	0	4	0	0	8	
Buses																		
Pedestrians		8				0				0				0			8	
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8	
Scooters																		

Comments:

Report generated on 12/3/2020 12:23 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

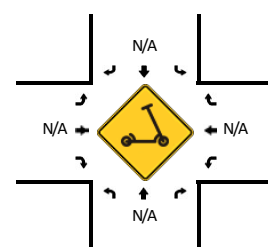
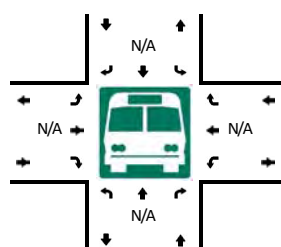
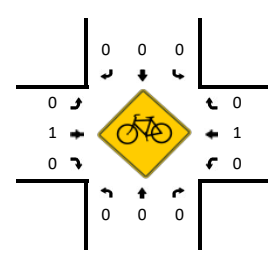
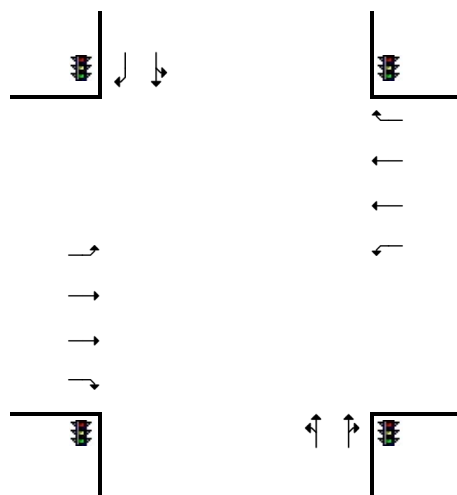
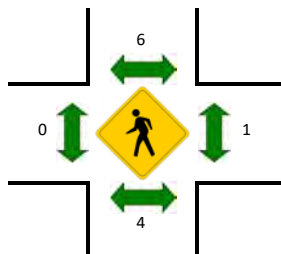
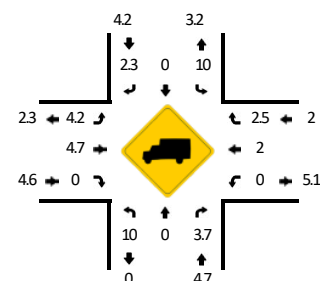
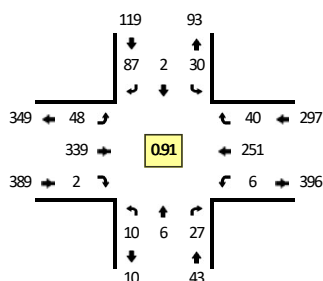
LOCATION: 3. Jane Ave -- Harder Rd

QC JOB #: 15323705

CITY/STATE: Hayward, CA

DATE: Thu, Nov 19 2020

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



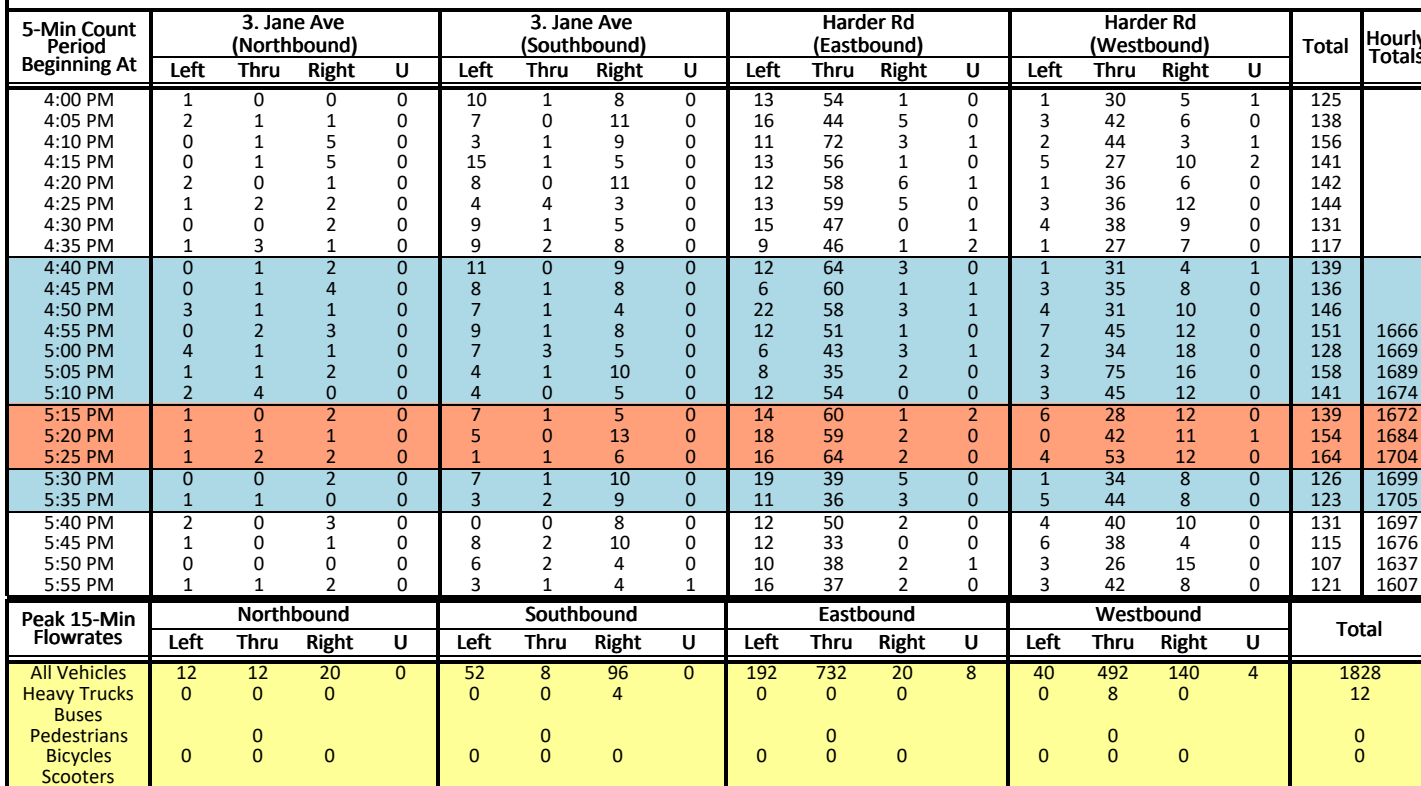
5-Min Count Period Beginning At	3. Jane Ave (Northbound)				3. Jane Ave (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	5	0	2	0	10	0	0	16	0	0	0	20	2	0	55	
7:05 AM	2	0	3	0	2	0	6	0	1	12	0	0	1	13	1	0	41	
7:10 AM	2	0	3	0	0	0	5	0	1	19	0	0	1	16	3	0	50	
7:15 AM	2	1	1	0	1	1	10	0	1	26	0	0	0	21	3	0	67	
7:20 AM	0	1	6	0	2	1	11	0	4	24	1	2	0	18	0	0	70	
7:25 AM	3	1	2	0	4	0	7	0	1	29	1	0	0	23	1	0	72	
7:30 AM	0	0	4	0	3	1	17	0	5	17	0	2	1	8	4	1	63	
7:35 AM	1	1	3	0	3	0	14	0	1	28	0	1	0	19	0	0	71	
7:40 AM	1	0	2	0	2	0	6	0	5	21	0	0	2	19	5	0	63	
7:45 AM	2	0	2	0	5	0	11	0	1	30	0	0	0	23	5	0	79	
7:50 AM	0	0	1	0	4	0	4	0	4	31	0	0	0	15	2	0	61	
7:55 AM	0	1	2	0	5	1	10	0	6	23	0	0	1	19	2	0	70	762
8:00 AM	1	2	2	0	4	0	8	0	8	23	0	0	0	19	1	0	68	775
8:05 AM	2	0	3	0	2	0	8	0	2	25	0	0	0	23	2	0	67	801
8:10 AM	0	1	2	0	4	0	8	0	1	23	2	0	0	25	5	0	71	822
8:15 AM	1	0	3	0	2	0	4	0	1	34	0	0	2	15	3	0	65	820
8:20 AM	2	0	2	0	1	0	8	0	2	30	0	0	2	20	2	0	69	819
8:25 AM	0	1	2	0	0	1	6	0	7	24	0	0	0	23	3	0	67	814
8:30 AM	0	0	2	0	5	0	5	0	3	21	0	0	0	22	3	0	61	812
8:35 AM	1	0	2	0	3	1	8	0	1	37	0	0	0	24	2	0	79	820
8:40 AM	1	2	1	0	2	0	7	0	5	29	0	0	1	18	3	0	69	826
8:45 AM	1	0	2	0	2	0	4	0	7	27	0	1	0	19	7	0	70	817
8:50 AM	0	0	4	0	3	0	11	0	7	29	0	0	0	22	7	0	83	839
8:55 AM	1	0	2	0	2	0	10	0	3	37	0	0	1	21	2	0	79	848
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	0	32	0	28	0	100	0	68	372	0	4	4	248	64	0	928	
Heavy Trucks	0	0	0	0	0	0	4	0	0	8	0	0	0	12	4	0	28	
Buses																		
Pedestrians		4				4				0				4			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4	
Scooters																		

Comments:

Report generated on 12/3/2020 12:23 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

QC JOB #: 15323706
DATE: Thu, Nov 19 2020



SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

SimTraffic Simulation Summary

Existing - Calibration

AM
03/10/2021

Summary of All Intervals

Start Time	6:55
End Time	8:00
Total Time (min)	65
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	2633
Vehs Exited	2640
Starting Vehs	87
Ending Vehs	80
Travel Distance (mi)	2160
Travel Time (hr)	87.6
Total Delay (hr)	19.8
Total Stops	1633
Fuel Used (gal)	71.9

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	2633
Vehs Exited	2640
Starting Vehs	87
Ending Vehs	80
Travel Distance (mi)	2160
Travel Time (hr)	87.6
Total Delay (hr)	19.8
Total Stops	1633
Fuel Used (gal)	71.9

SimTraffic Performance Report

Existing - Calibration

AM
03/10/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	1.6	0.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	49.8	50.5	5.0	63.2	60.0	5.3	55.7	14.0	5.6	64.5	16.8	5.8

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	21.1

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	4.2	0.9	0.0	2.1	1.1	1.1	6.6	3.4	1.4

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.4	0.2	0.1	0.0	0.0	0.0	0.4	0.1	0.2	0.1	0.1	0.1
Total Del/Veh (s)	52.5	4.2	0.0	80.7	5.7	1.7	55.2	38.6	4.7	37.0	30.1	4.1

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	9.2

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.6	3.7	1.5	2.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	26.0

Queuing and Blocking Report

Existing - Calibration

AM
03/10/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	165	70	78	133	17	84	66	60	33	168	226
Average Queue (ft)	47	67	13	17	35	3	15	7	5	1	84	96
95th Queue (ft)	116	126	42	49	77	13	47	34	26	12	151	178
Link Distance (ft)			297	297				2077	2077			629
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	2	5										
Queuing Penalty (veh)	0	1										

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	170	144	89	299	330	279
Average Queue (ft)	85	50	18	147	163	97
95th Queue (ft)	168	130	50	259	280	218
Link Distance (ft)	629	629		1400	1400	1400
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			500			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: Dollar Street & Harder Road

Movement	EB	SB	SB
Directions Served	L	L	TR
Maximum Queue (ft)	38	48	52
Average Queue (ft)	8	9	17
95th Queue (ft)	26	33	42
Link Distance (ft)		1478	1478
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	110		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

Existing - Calibration

AM
03/10/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	108	125	80	25	91	128	18	55	68	91	49
Average Queue (ft)	34	31	18	3	12	23	4	12	22	26	26
95th Queue (ft)	85	91	56	15	46	70	16	41	51	60	46
Link Distance (ft)		1676	1676		714	714	714	706	706	483	483
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	240			100							
Storage Blk Time (%)					0						
Queuing Penalty (veh)					0						

Intersection: 4: Mision Boulevard & South Driveway

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

SimTraffic Simulation Summary

Existing - Calibration

PM
03/10/2021

Summary of All Intervals

Start Time	4:55
End Time	6:00
Total Time (min)	65
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	4374
Vehs Exited	4355
Starting Vehs	140
Ending Vehs	159
Travel Distance (mi)	3499
Travel Time (hr)	162.6
Total Delay (hr)	50.5
Total Stops	3650
Fuel Used (gal)	122.4

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	4374
Vehs Exited	4355
Starting Vehs	140
Ending Vehs	159
Travel Distance (mi)	3499
Travel Time (hr)	162.6
Total Delay (hr)	50.5
Total Stops	3650
Fuel Used (gal)	122.4

SimTraffic Performance Report

Existing - Calibration

PM
03/10/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	1.9	0.1	2.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	56.2	44.8	11.1	61.0	50.3	6.9	56.9	25.4	22.8	75.4	36.8	16.5

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	32.8

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
Total Del/Veh (s)	8.9	1.3	0.1	5.7	1.2	1.0	10.0	40.1	4.4	3.0

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.9	0.3	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Total Del/Veh (s)	54.8	5.8	1.2	54.6	9.9	2.3	47.6	45.1	7.9	49.7	44.1	5.6

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	14.6

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.9	5.5	1.5	3.0

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	40.0

Queuing and Blocking Report

Existing - Calibration

PM
03/10/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	130	130	102	96	278	82	78	50	45	19	420	426
Average Queue (ft)	75	90	22	28	93	11	37	6	6	1	261	220
95th Queue (ft)	125	134	57	61	198	38	71	24	24	7	379	368
Link Distance (ft)			297	297				2080	2080			612
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	2	9	0		1							
Queuing Penalty (veh)	1	4	1		0							

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	412	379	87	350	398	368
Average Queue (ft)	209	187	27	236	258	194
95th Queue (ft)	358	340	66	329	377	321
Link Distance (ft)	612	612		1400	1400	1400
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			500			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: Dollar Street & Harder Road

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	TR	L	TR
Maximum Queue (ft)	58	29	18	30	107	54
Average Queue (ft)	22	7	1	2	27	31
95th Queue (ft)	49	26	6	14	73	53
Link Distance (ft)			297	314	1478	1478
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	110	80				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report

Existing - Calibration

PM
03/10/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	216	166	207	9	87	132	174	44	74	31	157	71
Average Queue (ft)	113	44	42	2	26	41	63	16	23	10	55	32
95th Queue (ft)	182	122	115	6	69	106	140	38	56	34	121	58
Link Distance (ft)		1676	1676	1676		714	714	714	706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100							
Storage Blk Time (%)					0	3						
Queuing Penalty (veh)					0	1						

Intersection: 4: Mision Boulevard & South Driveway

Movement	SB	SB
Directions Served	T	T
Maximum Queue (ft)	638	664
Average Queue (ft)	41	42
95th Queue (ft)	296	302
Link Distance (ft)	612	612
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 8

ATTACHMENT C
EXISTING PLUS PROJECT
OPERATIONS RESULTS WORKSHEETS

SimTraffic Simulation Summary

Existing + Project

AM
03/12/2021

Summary of All Intervals

Run Number	Avg	
Start Time	6:55	6:55
End Time	8:00	8:00
Total Time (min)	65	65
Time Recorded (min)	60	60
# of Intervals	2	2
# of Recorded Intervals	1	1
Vehs Entered	5811	5811
Vehs Exited	5845	5845
Starting Vehs	285	285
Ending Vehs	251	251
Travel Distance (mi)	4438	4438
Travel Time (hr)	237.5	237.5
Total Delay (hr)	95.8	95.8
Total Stops	6148	6148
Fuel Used (gal)	168.8	168.8

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	Avg	
Vehs Entered	5811	5811
Vehs Exited	5845	5845
Starting Vehs	285	285
Ending Vehs	251	251
Travel Distance (mi)	4438	4438
Travel Time (hr)	237.5	237.5
Total Delay (hr)	95.8	95.8
Total Stops	6148	6148
Fuel Used (gal)	168.8	168.8

SimTraffic Performance Report

Existing + Project

AM
03/12/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	1.6	0.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	57.6	51.0	21.3	63.6	52.0	5.0	73.0	32.1	22.0	51.3	55.3	38.4

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	46.7

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.0	0.0	0.0	0.0	0.0	3.9	0.1	0.4	0.1	0.2	0.1
Total Del/Veh (s)	5.7	3.4	2.7	15.3	1.8	0.4	168.1	54.4	42.8	25.6	56.7	31.1

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	15.1

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.7	0.3	0.1	0.2	0.0	0.1	0.2	0.1	0.1	0.3	0.2	0.3
Total Del/Veh (s)	50.2	13.7	1.3	52.9	18.1	5.3	30.4	29.4	9.2	38.2	34.7	9.6

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	19.6

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.1
Total Del/Veh (s)	1.0	10.0	3.4	6.3

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	56.2

Queuing and Blocking Report

Existing + Project

AM
03/12/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	175	295	260	240	126	139	68	64	37	428	359
Average Queue (ft)	113	149	158	140	122	54	72	27	18	4	235	209
95th Queue (ft)	156	195	270	221	225	105	124	55	51	19	343	337
Link Distance (ft)			292	292				2077	2077			629
Upstream Blk Time (%)			1									
Queuing Penalty (veh)			3									
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	10	35	21	0								
Queuing Penalty (veh)	17	62	67	0								

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	395	367	574	617	616	600
Average Queue (ft)	202	184	60	397	413	368
95th Queue (ft)	344	323	223	551	563	549
Link Distance (ft)	629	629		1400	1400	1400
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			500			
Storage Blk Time (%)				3		
Queuing Penalty (veh)				1		

Intersection: 2: Dollar Street & Harder Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	42	60	103	72	67	68	120	414	46	246
Average Queue (ft)	10	5	10	34	5	6	83	146	17	105
95th Queue (ft)	30	26	47	71	30	33	139	369	43	220
Link Distance (ft)		718	718		292	292		506	1491	1491
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			80			95			
Storage Blk Time (%)				0	0		40	2		
Queuing Penalty (veh)				0	0		37	2		

Queuing and Blocking Report

Existing + Project

AM
03/12/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	256	213	205	9	47	194	185	175	162	125	219	197
Average Queue (ft)	153	109	112	1	18	93	97	41	61	39	125	75
95th Queue (ft)	237	207	203	4	46	180	178	118	127	87	192	143
Link Distance (ft)		1676	1676	1676		718	718		706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100			100				
Storage Blk Time (%)	1					8	10					
Queuing Penalty (veh)	6					2	15					

Intersection: 4: Mision Boulevard & South Driveway

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	628	631	404
Average Queue (ft)	93	127	13
95th Queue (ft)	415	479	133
Link Distance (ft)	629	629	629
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 213

SimTraffic Simulation Summary

Existing + Project with Signal

AM
03/12/2021

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:55	6:55	6:55	6:55	6:55	6:55	6:55
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	65	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	5724	5874	5741	5747	5585	5844	5791
Vehs Exited	5765	5832	5722	5747	5558	5838	5826
Starting Vehs	250	238	233	218	237	248	243
Ending Vehs	209	280	252	218	264	254	208
Travel Distance (mi)	4357	4469	4386	4432	4269	4451	4436
Travel Time (hr)	222.1	235.7	231.0	244.1	215.7	254.7	231.4
Total Delay (hr)	83.2	93.4	90.9	103.1	79.8	112.7	90.0
Total Stops	5992	6458	6411	6725	5781	6916	6329
Fuel Used (gal)	162.8	168.2	165.4	169.5	158.9	172.3	166.6

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:55	6:55	6:55	6:55
End Time	8:00	8:00	8:00	8:00
Total Time (min)	65	65	65	65
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5810	5817	5720	5763
Vehs Exited	5817	5677	5729	5752
Starting Vehs	250	208	254	239
Ending Vehs	243	348	245	252
Travel Distance (mi)	4431	4372	4380	4398
Travel Time (hr)	236.9	270.2	223.7	236.5
Total Delay (hr)	95.9	130.8	84.3	96.4
Total Stops	6564	6810	5944	6391
Fuel Used (gal)	168.6	173.8	163.6	167.0

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

SimTraffic Simulation Summary

Existing + Project with Signal

AM
03/12/2021

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	5724	5874	5741	5747	5585	5844	5791
Vehs Exited	5765	5832	5722	5747	5558	5838	5826
Starting Vehs	250	238	233	218	237	248	243
Ending Vehs	209	280	252	218	264	254	208
Travel Distance (mi)	4357	4469	4386	4432	4269	4451	4436
Travel Time (hr)	222.1	235.7	231.0	244.1	215.7	254.7	231.4
Total Delay (hr)	83.2	93.4	90.9	103.1	79.8	112.7	90.0
Total Stops	5992	6458	6411	6725	5781	6916	6329
Fuel Used (gal)	162.8	168.2	165.4	169.5	158.9	172.3	166.6

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	5810	5817	5720	5763
Vehs Exited	5817	5677	5729	5752
Starting Vehs	250	208	254	239
Ending Vehs	243	348	245	252
Travel Distance (mi)	4431	4372	4380	4398
Travel Time (hr)	236.9	270.2	223.7	236.5
Total Delay (hr)	95.9	130.8	84.3	96.4
Total Stops	6564	6810	5944	6391
Fuel Used (gal)	168.6	173.8	163.6	167.0

SimTraffic Performance Report

Existing + Project with Signal

AM
03/12/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	2.0	0.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	54.2	44.9	18.8	63.1	56.5	6.5	68.0	32.3	22.8	57.3	67.6	49.8

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	50.1

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	3.9	0.4	0.4	0.1	0.2	0.2
Total Del/Veh (s)	14.1	10.3	8.7	21.1	3.2	1.8	47.1	38.9	14.6	44.8	42.6	12.8

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	11.9

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.9	0.3	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3
Total Del/Veh (s)	48.5	11.8	1.1	55.7	17.6	5.1	32.5	30.8	8.4	40.1	38.2	10.5

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	18.5

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.1
Total Del/Veh (s)	1.0	10.0	3.8	6.3

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	57.4

Queuing and Blocking Report
Existing + Project with Signal

AM
03/12/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	175	291	283	278	132	146	93	76	32	370	367
Average Queue (ft)	105	136	148	132	124	52	75	31	22	3	207	225
95th Queue (ft)	163	199	279	229	237	107	127	71	60	17	331	352
Link Distance (ft)			295	295				2077	2077			629
Upstream Blk Time (%)			2	0	0							
Queuing Penalty (veh)			8	1	0							
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	11	26	14	0	0							
Queuing Penalty (veh)	19	46	43	1	0							

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	361	338	334	714	723	709
Average Queue (ft)	212	188	74	455	479	438
95th Queue (ft)	334	309	308	784	793	766
Link Distance (ft)	629	629		1400	1400	1400
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				0		
Storage Bay Dist (ft)			500			
Storage Blk Time (%)				10		
Queuing Penalty (veh)				5		

Intersection: 2: Dollar Street & Harder Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	137	268	336	86	89	91	118	180	75	230
Average Queue (ft)	26	98	123	38	14	25	69	51	18	74
95th Queue (ft)	86	220	273	76	53	70	116	125	53	157
Link Distance (ft)		718	718		295	295		511	1491	1491
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			80			95			
Storage Blk Time (%)	0	5		1	0		9	2		
Queuing Penalty (veh)	0	3		2	0		8	2		

Queuing and Blocking Report

Existing + Project with Signal

AM
03/12/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	242	253	240	5	81	199	215	162	109	76	222	194
Average Queue (ft)	134	103	109	0	18	91	100	34	46	29	116	83
95th Queue (ft)	223	200	203	3	55	173	181	106	90	62	197	153
Link Distance (ft)		1676	1676	1676		718	718		706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100			100				
Storage Blk Time (%)	0	0				7	9	0				
Queuing Penalty (veh)	2	0				1	13	0				

Intersection: 4: Mision Boulevard & South Driveway

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	584	623	205
Average Queue (ft)	83	93	7
95th Queue (ft)	380	423	104
Link Distance (ft)	629	629	629
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	1	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 156

SimTraffic Simulation Summary

Existing + Project

PM
03/12/2021

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:55	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	6095	6249	6299	6195	6140	6132	6249
Vehs Exited	6089	6232	6273	6205	6151	6137	6205
Starting Vehs	220	215	259	232	209	233	217
Ending Vehs	226	232	285	222	198	228	261
Travel Distance (mi)	4691	4810	4856	4743	4744	4730	4795
Travel Time (hr)	237.5	250.7	256.7	243.3	241.9	243.3	258.2
Total Delay (hr)	86.6	95.7	100.4	90.5	89.3	91.0	103.3
Total Stops	5634	6156	6300	6034	5899	5853	6147
Fuel Used (gal)	171.7	177.4	180.1	174.1	174.3	173.3	178.5

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6048	6215	6241	6185
Vehs Exited	6029	6227	6252	6181
Starting Vehs	213	225	233	224
Ending Vehs	232	213	222	230
Travel Distance (mi)	4644	4752	4774	4754
Travel Time (hr)	236.6	244.7	247.7	246.1
Total Delay (hr)	87.0	91.8	93.7	92.9
Total Stops	5828	6089	6016	5996
Fuel Used (gal)	170.8	174.1	176.5	175.1

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

SimTraffic Simulation Summary

Existing + Project

PM
03/12/2021

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	6095	6249	6299	6195	6140	6132	6249
Vehs Exited	6089	6232	6273	6205	6151	6137	6205
Starting Vehs	220	215	259	232	209	233	217
Ending Vehs	226	232	285	222	198	228	261
Travel Distance (mi)	4691	4810	4856	4743	4744	4730	4795
Travel Time (hr)	237.5	250.7	256.7	243.3	241.9	243.3	258.2
Total Delay (hr)	86.6	95.7	100.4	90.5	89.3	91.0	103.3
Total Stops	5634	6156	6300	6034	5899	5853	6147
Fuel Used (gal)	171.7	177.4	180.1	174.1	174.3	173.3	178.5

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	6048	6215	6241	6185
Vehs Exited	6029	6227	6252	6181
Starting Vehs	213	225	233	224
Ending Vehs	232	213	222	230
Travel Distance (mi)	4644	4752	4774	4754
Travel Time (hr)	236.6	244.7	247.7	246.1
Total Delay (hr)	87.0	91.8	93.7	92.9
Total Stops	5828	6089	6016	5996
Fuel Used (gal)	170.8	174.1	176.5	175.1

SimTraffic Performance Report

Existing + Project

PM
03/12/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	1.8	0.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	61.2	58.8	12.4	57.1	59.6	10.7	59.1	29.6	25.5	70.1	49.4	32.4

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	41.3

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	5.7	1.5	2.3	0.1	0.1	0.1
Total Del/Veh (s)	12.3	2.8	2.4	13.0	2.0	1.9	95.3	60.5	33.5	59.7	56.0	16.6

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	11.1

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.0	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	45.9	11.8	1.7	57.0	21.6	8.5	36.0	32.6	6.7	40.5	40.0	11.1

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	21.8

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	1.2	7.7	4.0

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	51.7

Queuing and Blocking Report

Existing + Project

PM
03/12/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	174	300	207	185	159	186	195	201	90	484	544
Average Queue (ft)	109	132	108	78	78	70	96	100	102	10	270	304
95th Queue (ft)	160	192	245	149	151	135	157	168	175	48	428	458
Link Distance (ft)			292	292				2080	2080			612
Upstream Blk Time (%)			0	0							0	0
Queuing Penalty (veh)			2	0							0	0
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	14	28	3	0		0	0	0	3		0	0
Queuing Penalty (veh)	14	27	11	0		0	0	0	2		1	1

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	TR
Maximum Queue (ft)	548	540	112	455	484	454
Average Queue (ft)	298	287	46	298	322	283
95th Queue (ft)	454	448	95	429	452	426
Link Distance (ft)	612	612		1400	1400	1400
Upstream Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)			500			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 2: Dollar Street & Harder Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	78	49	55	95	76	89	118	301	98	134
Average Queue (ft)	24	4	5	36	7	9	75	104	32	57
95th Queue (ft)	57	23	26	82	48	45	130	297	75	104
Link Distance (ft)		718	718		292	292		506	1491	1491
Upstream Blk Time (%)								3		
Queuing Penalty (veh)								0		
Storage Bay Dist (ft)	110			80			95			
Storage Blk Time (%)		0		1	0		23	5		
Queuing Penalty (veh)		0		5	0		27	5		

Queuing and Blocking Report

Existing + Project

PM
03/12/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	264	435	329	16	124	310	334	175	70	53	191	156
Average Queue (ft)	201	123	99	2	57	143	155	77	28	20	94	68
95th Queue (ft)	285	308	227	10	120	264	281	188	64	47	168	126
Link Distance (ft)		1676	1676	1676		718	718		706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100			100				
Storage Blk Time (%)	7	0			2	14	17	0				
Queuing Penalty (veh)	26	0			6	8	36	1				

Intersection: 4: Mision Boulevard & South Driveway

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	8	3	3	449	496
Average Queue (ft)	0	0	0	28	36
95th Queue (ft)	6	3	3	223	256
Link Distance (ft)	1010	1010	1010	612	612
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Bend

Movement	NB	B11	B11
Directions Served	T	T	T
Maximum Queue (ft)	3	3	142
Average Queue (ft)	0	0	5
95th Queue (ft)	3	3	140
Link Distance (ft)	89	1400	1400
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

Existing + Project

PM
03/12/2021

Intersection: 11: Bend

Movement	NB	NB
Directions Served	T	T
Maximum Queue (ft)	3	142
Average Queue (ft)	0	5
95th Queue (ft)	3	140
Link Distance (ft)	1400	1400
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 174

SimTraffic Simulation Summary

Existing + Project with Signal

PM
03/12/2021

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:55	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	6211	6166	6018	6254	6205	6079	6290
Vehs Exited	6223	6167	6029	6249	6213	6092	6284
Starting Vehs	231	217	234	216	214	250	227
Ending Vehs	219	216	223	221	206	237	233
Travel Distance (mi)	4802	4721	4617	4803	4776	4666	4798
Travel Time (hr)	248.4	242.1	236.6	249.5	241.7	240.1	248.2
Total Delay (hr)	93.9	90.0	88.1	95.4	88.0	90.0	93.9
Total Stops	6260	6198	6062	6358	6087	6170	6359
Fuel Used (gal)	176.5	173.3	170.2	177.4	174.5	171.1	177.0

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6162	6195	6133	6167
Vehs Exited	6139	6186	6153	6172
Starting Vehs	226	221	266	232
Ending Vehs	249	230	246	227
Travel Distance (mi)	4729	4770	4751	4743
Travel Time (hr)	237.9	247.4	243.9	243.6
Total Delay (hr)	85.8	93.8	91.2	91.0
Total Stops	5926	6278	6139	6182
Fuel Used (gal)	171.9	175.6	174.8	174.2

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

SimTraffic Simulation Summary

Existing + Project with Signal

PM
03/12/2021

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	6211	6166	6018	6254	6205	6079	6290
Vehs Exited	6223	6167	6029	6249	6213	6092	6284
Starting Vehs	231	217	234	216	214	250	227
Ending Vehs	219	216	223	221	206	237	233
Travel Distance (mi)	4802	4721	4617	4803	4776	4666	4798
Travel Time (hr)	248.4	242.1	236.6	249.5	241.7	240.1	248.2
Total Delay (hr)	93.9	90.0	88.1	95.4	88.0	90.0	93.9
Total Stops	6260	6198	6062	6358	6087	6170	6359
Fuel Used (gal)	176.5	173.3	170.2	177.4	174.5	171.1	177.0

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	6162	6195	6133	6167
Vehs Exited	6139	6186	6153	6172
Starting Vehs	226	221	266	232
Ending Vehs	249	230	246	227
Travel Distance (mi)	4729	4770	4751	4743
Travel Time (hr)	237.9	247.4	243.9	243.6
Total Delay (hr)	85.8	93.8	91.2	91.0
Total Stops	5926	6278	6139	6182
Fuel Used (gal)	171.9	175.6	174.8	174.2

SimTraffic Performance Report
Existing + Project with Signal

PM
03/12/2021

1: Mision Boulevard & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	1.7	0.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	56.0	54.4	12.2	55.7	59.1	10.2	57.0	30.0	26.5	67.4	47.2	30.3

1: Mision Boulevard & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	40.0

2: Dollar Street & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	3.8	0.4	0.4	0.2	0.1	0.2
Total Del/Veh (s)	20.5	9.5	7.2	17.5	4.6	3.6	45.2	37.6	12.4	45.3	42.8	11.2

2: Dollar Street & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	11.0

3: Jane Avenue & Harder Road Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.0	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	46.4	12.1	1.9	54.3	23.3	8.9	37.7	33.1	7.2	40.3	43.5	10.6

3: Jane Avenue & Harder Road Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	22.6

4: Mision Boulevard & South Driveway Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	1.2	7.3	3.9

Total Network Performance

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	50.7

Queuing and Blocking Report
Existing + Project with Signal

PM
03/12/2021

Intersection: 1: Mision Boulevard & Harder Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	137	174	288	184	188	152	179	206	183	56	428	533
Average Queue (ft)	109	131	96	72	81	67	93	100	99	7	255	307
95th Queue (ft)	161	189	233	140	154	127	151	172	166	30	388	458
Link Distance (ft)			295	295				2080	2080			612
Upstream Blk Time (%)			0	0								
Queuing Penalty (veh)			2	0								
Storage Bay Dist (ft)	100	100			280	240	240			140	530	
Storage Blk Time (%)	13	26	3	0			0	0	3			0
Queuing Penalty (veh)	12	25	9	0			0	0	2			1

Intersection: 1: Mision Boulevard & Harder Road

Movement	NB	NB	SB	SB	SB	SB	B8
Directions Served	T	TR	L	T	T	TR	T
Maximum Queue (ft)	524	525	110	404	439	423	3
Average Queue (ft)	306	298	45	294	319	274	0
95th Queue (ft)	459	453	96	397	425	396	3
Link Distance (ft)	612	612		1400	1400	1400	945
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			500				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 2: Dollar Street & Harder Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	115	194	280	103	161	193	119	194	80	124
Average Queue (ft)	32	59	86	43	34	54	65	59	24	50
95th Queue (ft)	78	146	200	85	109	138	117	136	61	92
Link Distance (ft)		718	718		295	295		511	1491	1491
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			80			95			
Storage Blk Time (%)	0	3		1	2		9	2		
Queuing Penalty (veh)	0	2		5	2		10	2		

Queuing and Blocking Report

Existing + Project with Signal

PM
03/12/2021

Intersection: 3: Jane Avenue & Harder Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	TR	LT	R
Maximum Queue (ft)	264	440	332	14	124	357	364	175	93	52	196	151
Average Queue (ft)	201	141	94	2	60	144	156	76	30	19	95	64
95th Queue (ft)	288	349	219	8	124	271	288	188	70	48	166	115
Link Distance (ft)		1676	1676	1676		718	718		706	706	483	483
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240				100			100				
Storage Blk Time (%)	9				2	15	19	0				
Queuing Penalty (veh)	33				6	9	39	1				

Intersection: 4: Mision Boulevard & South Driveway

Movement	SB	SB
Directions Served	T	T
Maximum Queue (ft)	358	268
Average Queue (ft)	16	9
95th Queue (ft)	158	113
Link Distance (ft)	612	612
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Bend

Movement	NB	NB	NB
Directions Served	T	T	T
Maximum Queue (ft)	5	3	8
Average Queue (ft)	0	0	0
95th Queue (ft)	5	3	6
Link Distance (ft)	89	89	89
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 162